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IMPERIAL BUREAU OF ANIMAL HEALTH

THE
VETERINARY BULLETIN

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PUBLICATIONS INDEXED AND SURVEYED BY THE IMPERIAL BUREAU OF ANIMAL HEALTH.

The Imperial Bureau of Animal Health acts as a clearing-house for information on all important British and foreign scientific work relating to veterinary research, administration, public health and education.

Subjects abstracted and reviewed in the *Veterinary Bulletin* are dealt with under the following headings :—

1. Diseases caused by Bacteria and Fungi.
2. Diseases caused by Protozoan Parasites.
3. Diseases caused by Filtrable Viruses.
4. Diseases, General.
5. Diseases related to Genetical Factors.
6. Diseases caused by Metazoan Parasites.
7. Invertebrate Vectors of Disease.
8. Immunity.
9. Public Health.
10. Physiology.
11. Poisons and Poisoning.
12. Therapeutics.
13. Zootechny.
14. Technique.
15. Miscellaneous.
16. Official and Other Reports.
17. Book Reviews.

Lists of publications to be dealt with from 1933 onwards are shown below. It is considered that these lists will be of value in order that readers of the *Veterinary Bulletin* can ascertain the scope of the literature covered and the range of countries included.

There has been great difficulty in tracing the existence of quite a large number of apparently relevant publications of which names have been found. Many of them are obsolete and are not easily traceable, but quite a number are probably actually in existence. When such publications are verified they will be added to the lists, so that those given below by no means cover the complete range of literature that will be dealt with.

The Editor will be glad to receive suggestions concerning publications not now included in these lists.

LIST OF VETERINARY PUBLICATIONS.

INTERNATIONAL PUBLICATIONS.

Bulletin de l'Office international des Epizooties.

International Veterinary Congress. Report of Proceedings.

EUROPE.

BRITISH EMPIRE.

GREAT BRITAIN.

Aberdeen, City of. Report on the Veterinary Services.—*Annual Report of the Medical Officer of Health.*

Ayrshire, County Council of. Annual Report of the County Veterinary Officer.

Birmingham, City of. Annual Report of the Chief Veterinary Officer.

Blackburn, County Borough of. Report of the Veterinary Inspector.—*Annual Report on the Health of Blackburn.*

Bolton, County Borough of. Veterinary Surgeon's Report.—*Annual Report of the Medical Officer of Health.*

Burnley, County Borough of. Report of the Veterinary Officer.—*Annual Report of the Medical Officer.*

Cambridge, University of. Annual Report of the Director, Institute of Animal Pathology.

Cumberland. Quarterly Reports of the Chief Veterinary Inspector.

Diseases of Animals Acts. Amendments, including Revised Index to Handbook and Orders thereunder.

Dumbarton, County of. Annual Report of the County Veterinary Inspector.

Durham, County Council of. Annual Report of the Chief Veterinary Officer.

Edinburgh, City of. Annual Report of the Veterinary Department.

Glamorgan, County of. Quarterly Report of the County Veterinary Inspector.

The Journal of Comparative Pathology and Therapeutics.

The Journal of the Royal Army Veterinary Corps.

Lanark, County of. County Veterinary Inspector's Annual Report of the County of Lanark and the Burghs of Biggar and Lanark.

Leeds, City of. Report of the Chief Veterinary Officer.—*Annual Report of the Medical Officer of Health.*

Liverpool, City of. Annual Report of the Chief Veterinary Officer on the Work of his Department.

Manchester, City of. Annual Report of the Veterinary Officer.—*Report on the Health of the City.*

Midlothian, County of. Annual Report by the County Veterinary Inspector.

Newcastle-on-Tyne, City and Council of. Annual Report of the Veterinary Officer.

Nottinghamshire County Council. Annual Report of the Chief Veterinary Inspector.

Preston, County Borough of. Annual Report of the Veterinary Officer.—*Report of the Medical Officer of Health.*

Renfrew, County of. Annual Report by the County Veterinary Inspector.

Royal Army Veterinary Services. Official Statistical Report.

Sheffield, City of. Annual Report of the Chief Veterinary Inspector.

Somerset, County of. Annual Report of the County Veterinary Officer.

Stirling, County of. Annual Report by the County Veterinary Inspector.

Surrey County Council. Annual Report of the Chief Veterinary Officer.

The Veterinary Bulletin.

The Veterinary Journal.

The Veterinary Record.

Yorkshire, West Riding of. Annual Report of the Chief Veterinary Officer of the County Council.

NORTHERN IRELAND.

Animal Diseases Research Division. Report.—*Ibid.*

Diseases of Animals Acts.—*Annual Report of the Ministry of Agriculture.*

IRISH FREE STATE.

Diseases of Animals Acts. Fortnightly Statistics.

Diseases of Animals Acts. Report.— *-th and Final General Report of the Department of Agriculture and Technical Instruction for Ireland.*

The Veterinary College of Ireland. Report.—*Ibid.*

The Veterinary Hygiene Division, Department of Agriculture. Report.—*Ibid.*

The Veterinary Research Laboratory, Department of Agriculture. Report.—*Ibid.*

OTHER COUNTRIES.

AUSTRIA.

Der österreichische Tierarzt.

Wiener tierärztliche Monatsschrift.

BELGIUM.

Annales de Médecine vétérinaire.

Bulletin sanitaire.

L'écho vétérinaire.

BULGARIA.
Veterinarna Sbirka.

CZECHOSLOVAKIA.
Biologické spisy vysoké skoly zverolékarské, Brno.
Karlsbad Schlachthof, die Lebensmittel-Kontrolle in. Bericht des Städtischen Marktamtes.
Klinické spisy vysoké skoly zverolékarské Brno.
Prager Archiv für Tiermedizin und vergleichende Pathologie.
Užhorod, Staatliche Veterinärlaboratorium. Tätigskeitbericht.
Vojenské Veterinárství.—*Zverolékarsky Obzor.*
Zverolékarsky Obzor.
Zverolékarske Rozpravy.—*Zverolékarsky Obzor.*

DENMARK.
Kongelige Veterinaer- og Landbohøjskole. Aarskrift.
Kongelige Veterinaer- og Landbohøjskoles Serum Laboratorium. Meddelelser.
Maanedsskrift for Dyrlaeger.
Veterinaerdirektoratet. Aarsberetning.
Veterinaere Sundhedsraad. Aarsberetning.
Veterinaerfysikatet. Aarsberetning.

ESTONIA.
Eesti Loomaarstlik Ringvaade.

FINLAND.
Suomen Elainlääkärilehti.

FRANCE.
Alfort, Ecole nationale vétérinaire. Thèses.
Bulletin de l'Académie vétérinaire de France.
Bulletin de la Société des Sciences vétérinaires de Lyon.
Bulletin de la Société vétérinaire de la Seine-Inférieure et de l'Eure.
Bulletin de la Société vétérinaire pratique.
Lyon, Ecole nationale vétérinaire. Thèses.
Rapport sur les opérations du Service vétérinaire sanitaire de Paris et du Département de la Seine.
Receuil de Médecine vétérinaire.
Receuil de Médecine vétérinaire exotique.
Revue générale de Médecine vétérinaire.
Revue de Pathologie comparée.
Revue vétérinaire et Journal de Médecine vétérinaire et de Zootechnie.
Revue vétérinaire militaire.

GERMANY.
Archiv für wissenschaftliche und praktische Tierheilkunde.
Berlin, Tierärztliche Hochschule. Inaugural Dissertations.
Berliner tierärztliche Wochenschrift.
Deutsche Schlachthof-Zeitung.
Deutsche tierärztliche Wochenschrift.
Deutscher Veterinärrat. Bericht über die Vollversammlung.
Fachtierärzte zur Bekämpfung der Aufzuchtkrankheiten. Bericht über die Tagung.
Gesellschaft Deutscher Naturforscher und Aerzte. Berichte über die Vorträge der tierärztlichen Abteilung.
Giessen, Veterinärmedizinische Fakultät der Universität. Inaugural Dissertations.
Hannover, Tierärztliche Hochschule. Inaugural Dissertations.
Jahresbericht der bakteriologischen Fleischuntersuchungsstelle am Schlachthof München. — *Münchener tierärztliche Wochenschrift.*
Jahresbericht Veterinär-Medizin.
Leipzig, Veterinärmedizinische Fakultät der Universität. Inaugural Dissertations.
Mitteilungen der tierärztlichen Gesellschaft zur Bekämpfung des Kurpfuschertums.—*Tierärztliche Rundschau and Münchener tierärztliche Wochenschrift.*
Mitteilungen des Vereins badischer Tierärzte.
München, Veterinärmedizinsche Fakultät der Universität. Inaugural Dissertations.
Münchener tierärztliche Wochenschrift.
Niederschlesien. Bericht über die Tätigkeit des Bakteriologischen Instituts der Landwirtschaftskammer im Jahre 19—.
Rundschau auf dem Gebiete der gesamten Fleischbeschau und Trichinenschau des Schlacht- und Viehhofwesens.
Sachsen, Freistaat. Bericht über das Veterinärwesen für die Jahre 19— und 19—.
Sachsen, Provinz. Bericht über die Tätigkeit des Bakteriologischen Instituts der Landwirtschaftskammer zu Halle a. S.
Schlachthofwesen und Lebensmittelüberwachung.—*Deutsche tierärztliche Wochenschrift.*
Stuttgarter tierärztliche Monatsschrift.
Tierärztliche Mitteilungen, Amtliches Organ des Reichsverbandes praktischer Tierärzte.
Tierärztliche Rundschau.
Die Verbreitung von Tierseuchen und die Ergebnisse der Schlachtvieh- und Fleischbeschau in den Jahren 19— und 19—. —*Statistik des Deutschen Reichs.*
Veröffentlichungen aus den Jahres-Veterinär-Berichten der beamteten Tierärzte Preussens für die Jahre 19— und 19—.
Württemberg. Tierärztlicher Bericht für das Jahr 19—.
Zeitschrift für Fleisch- und Milchhygiene.
Zeitschrift für Infektionskrankheiten, parasitäre Krankheiten und Hygiene der Haustiere.
Zeitschrift für Veterinärkunde.

HOLLAND.
Tijdschrift voor Diergeneeskunde.
Verslag aan den Minister van Staat, Minister van Binnenlandsche zaken en Landbouw omtrent de Werkzaamheden van Veeart-

senijkundigen dienst en den Gezondheidstoestand van den Veestapel in 19—.
Verslag van de Werkzaamheden der Rijksseruminrichting 19—.

HUNGARY.
Allategészségügy.
Allategészségügyi évkönyv.
Allatorvosi Közlöny.
Allatorvosi Lapok.
Közlen énvek az Osszehasonlitó élet- es Kórtan Köréböl.
Royal Hungarian Veterinary College. Inaugural Dissertations.

ITALY.
La Clinica veterinaria.
Il Moderno Zooiatro.
Il Nuovo Ercolani.
La Nuova Veterinaria.
Profilassi.
Relazione sull' attivita svolta dall' Institute Zooprofilattico Sperimentale delle Tre Venezie durante l'anno 19—.
Relazione sul funzionamento della Stazione sperimentale per la malattie infettive del bestiame, nel suo primo decennio di vita.

NORWAY.
Norges Manedsrapport over smittsamme Husdyrsykdommer. Utgitt av Veterinaerdirektøren.
Norges Offisielle Statistikk. (Contains Civile Veterinaervesen.)
Norsk Veterinaer-tidsskrift.
Oslo Slaktehus. Beretning.

POLAND.
Przeglad weterynaryjne.
Wiadomosci weterynaryjne.

PORTUGAL.
Revista de medicina veterinaria.

ROUMANIA.
Buletinul directiunei Zootehnice si Sanitare Veterinare.
Revista de Medicina veterinara si de Zootechnie. (Buletinul Associatiei Generale a Medicilor veterinari).
Revista Stiintelor Veterinare.

RUSSIA.
Prahtitcheskaya Veterinaria.
Tropitcheskaja Medizina i Veterinaria.
Trudy Gossoudarstvennovo Instituto Experimentalnoy Veterinarii.
Veterinarny Specialist na Ssozialistitscheskoy Strojke.
Warsaw University. Inaugural Dissertations of Veterinary Faculty.

SPAIN.
Revista de Hygiene y Sanidad pecuarias.
Revista de Medicina veterinaria.
La Semana veterinaria.

SWEDEN.
Det Civila veterinärväsendet.
Malmöhus läns hushallningssallskaps. Marknadsplats och Veterinärbakteriologiska Laboratorium. Berättelse över Verksamheten under ar 19—.
Skandinavisk Veterinär-tidskrift.
Statens Veterinärbakteriologiska Anstalt. Berättelse över Verksamheten.
Svensk Veterinär-tidskrift.
Veterinärhögskolan. Berattelse över verksamheten under läsaret 19—.
Veterinärhögskolan i Stockholm. Meddelanden.

SWITZERLAND.
Bulletin de l'Office vétérinaire et de la Division d'Agriculture. [Also printed in German.]
Bulletin de la Société vaudoise des Vétérinaires.
Schweizer Archiv für Tierheilkunde.

YUGOSLAVIA.
Jugoslovenski Veterinarski Glasnik.
Veterinarski Arhiv.

ASIA.

BRITISH EMPIRE.

BRITISH MALAYA.
Straits Settlements. Annual Report of the Veterinary Department.

CEYLON.
Government Veterinary Surgeon. Annual Administration Report.

CYPRUS.
Veterinary Service. Annual Report.

HONG KONG.
Colonial Veterinary Surgeon. Annual Report.

INDIA.
Army Veterinary Service. Annual Administration Report.
Bengal Veterinary College and Civil Veterinary Department. Annual Report.
Bihar and Orissa, Civil Veterinary Department. Annual Report.
Bombay Veterinary College, Bombay City and Harbour Veterinary Department and Civil Veterinary Department in the Bombay Presidency (including Sind). Annual Administration Report.
British Baluchistan, Civil Veterinary Department. Annual Administration Report.
Central Provinces and Berar, Civil Veterinary Department. Annual Report.
H.E.H. the Nizam's Government, Stud and Veterinary Department. Hyderabad-Deccan. Annual Report.
Imperial Council of Agricultural Research. Annual Report.

Imperial Institute of Veterinary Research, Muktesar. Annual Report.
Indian Journal of Veterinary Science and Animal Husbandry.
Indian Veterinary Journal.
Pasteur Institute, Coonoor. Annual Report of the Director.
Madras Civil Veterinary Department. Annual Administration Report.
Mysore Civil Veterinary Department. Annual Report.
North-West Frontier Province Civil Veterinary Department. Annual Report.
Punjab Civil Veterinary Department. Annual Report.
United Provinces Civil Veterinary Department. Annual Report.
United Provinces Veterinary Magazine.

PALESTINE.
Veterinary Laboratory. Annual Report.—*Annual Report of the Department of Agriculture and Forests.*
Veterinary Service. Annual Report.—*Ibid.*

OTHER COUNTRIES.

DUTCH EAST INDIES.
Nederlandsch-Indische Bladen voor Diergeneeskunde.
Veeartsenijkundige Mededeelingen van het Department van Landbouw Nijverheid en Handel te Buitenzorg.
Veeartsenijkundig Instituut. Verslag.

IRAQ.
Civil Veterinary and Remount Department. Annual Report.

JAPAN.
Government Institute for Veterinary Research. Annual Report.
Journal of the Japanese Society of Veterinary Science.
Veterinary Laboratory, Ministry of Agriculture and Forestry. Annual Report.

MANCHURIA.
Mukden Institute for Infectious Diseases of Animals. Selected Contributions.

SIAM.
Veterinary Division, Department of Agriculture. Annual Report.

AFRICA.

BRITISH EMPIRE.

BASUTOLAND.
Principal Veterinary Officer. Annual Report.

BECHUANALAND.
Chief Veterinary Officer. Annual Report.

GOLD COAST.
Department of Animal Health. Annual Report.

KENYA.
Chief Veterinary Officer. Annual Report.—*Annual Report, Department of Agriculture.*
Chief Veterinary Research Officer. Annual Report.—*Ibid.*

MAURITIUS.
Government Veterinary Surgeon. Annual Report.—*Annual Report on the Department of Agriculture.*

NIGERIA.
Northern Provinces. Annual Report on the Veterinary Department.

NYASALAND.
Veterinary Department. Annual Report.

NORTHERN RHODESIA.
Department of Animal Health. Annual Bulletin.
Department of Animal Health. Annual Report.

SOUTHERN RHODESIA.
Chief Veterinary Surgeon. Annual Report.
Director of Veterinary Research. Annual Report.

SOMALILAND.
Annual Veterinary Report.

SUDAN.
Sudan Veterinary Service. Annual Report.

TANGANYIKA.
Department of Veterinary Science and Animal Husbandry. Annual Report.

UGANDA.
Veterinary Department. Annual Report.

UNION OF SOUTH AFRICA.
Johannesburg Abattoirs and Livestock Market Department. Annual Report of the Director.
Journal of the South African Veterinary Medical Association.
Veterinary Services and Animal Industry, Onderstepoort. Annual Report of the Director.

OTHER COUNTRIES.

EGYPT.
Veterinary Service, Ministry of Agriculture. Annual Report.

NORTH AMERICA.

BRITISH EMPIRE.

CANADA.
British Columbia, Province of. Account of Veterinary Work.—*Annual Report of the Department of Agriculture.*
British Columbia, Experiment Station, Agassiz. Report of the Animal Husbandry Department.—*Annual Report of the Superintendent, Experiment Farm, Department of Agriculture.*

Department of Veterinary Science, Ontario Research Foundation. Report.—*Ontario Research Foundation Report.*
Ontario Veterinary College. Annual Report. —*Annual Report of the Department of Agriculture.*
Quebec Veterinary College and Veterinary Department. Annual Report.—*Rapport de Ministre de l'Agriculture de la Province de Quebec.*
Veterinary Director General, Department of Agriculture. Annual Report.

OTHER COUNTRIES.

UNITED STATES.

Bureau of Animal Industry, Department of Agriculture. Annual Report of the Chief.
Colorado Agricultural Experiment Station, Veterinary Department. Report.—*Annual Report of the Colorado Agricultural Experiment Station.*
The Cornell Veterinarian.
Journal of the American Veterinary Medical Association.
Michigan State College of Agriculture and Applied Science. Annual Report of the Division of Veterinary Science. [Reprinted from the report of the secretary of the State Board of Agriculture].
New York State Veterinary College. Annual Report.
The North American Veterinarian.
South Dakota Agricultural Experiment Station. Account of Veterinary Work.—*Annual Report of the Director of the South Dakota Agricultural Experiment Station.*
Veterinary Bulletin, U.S. Army.
Veterinary Medicine.
Washington Agricultural Experiment Station, State College of. Veterinary Report.

SOUTH AMERICA.

BRITISH EMPIRE.

BRITISH GUIANA.

Government Veterinary Surgeon, Department of Science and Agriculture. Annual Report.

JAMAICA.

Government Veterinary Surgeon. Report.—*Annual Report of the Department of Agriculture.*

LEEWARD ISLANDS.

Antigua. Report on the General Health of the Stock.

TRINIDAD.

Government Veterinary Surgeon. Report. —*Annual Administration Report of the Director of Agriculture.*

OTHER COUNTRIES.

ARGENTINE.

Revista del Instituto Bacteriologico del Departamento Nacional de Higiene.
Revista Zootécnica.

COLOMBIA.

Revista de Medicina Veterinaria.

CUBA.

Boletin Mensual de la Asociacion Nacional de Medicina Veterinaria de Cuba.

PANAMA.

Miraflores Veterinary Research Station. Account of Veterinary Work.—*Annual Report of the Gorgas Memorial Institute of Tropical and Preventive Medicine.*

URUGUAY.

Anales de la Escuela de Veterinaria del Uruguay.

OCEANIA.

BRITISH EMPIRE.

AUSTRALIA.

Animal Health Investigations Report.—*Annual Report of the Council for Scientific and Industrial Research.*
Australian Veterinary Journal.
New South Wales, Department of Agriculture. Livestock Diseases Report recording control work.
New South Wales, Department of Agriculture. Veterinary Research Report.
Queensland. Report of the Chief Inspector of Stock.—*Annual Report of the Department of Agriculture and Stock.*
South Australia. Stock and Brands Department, Department of Agriculture. Annual Report.
Tasmania, Veterinary Officer, Department of Agriculture. Annual Report.
Western Australia. Chief Veterinary Officer, Department of Agriculture. Report.—*Annual Report of the Department of Agriculture.*
Western Australia. Veterinary Pathologist, Department of Agriculture.—*Ibid.*

FIJI.

Veterinary Division, Agricultural Department. Annual Report.

NEW ZEALAND.

Livestock Division, Department of Agriculture. Report.—*Annual Report of the Department of Agriculture.*
Wallaceville (Veterinary) Laboratory. Annual Report.—*Ibid.*

LIST OF MISCELLANEOUS PUBLICATIONS.

INTERNATIONAL PUBLICATIONS.

Medicine.
Bulletin de l'Office international d'Hygiène publique.

Agriculture.
International Review of Agriculture.
World's Poultry Congress.

EUROPE

BRITISH EMPIRE.

GT. BRITAIN.

Medicine.
Annals of the Pickett-Thompson Research Laboratory.
Annals of Tropical Medicine and Parasitology.
British Journal of Experimental Pathology.
British Medical Journal.
Bulletin of Hygiene.
Journal of Hygiene, Cambridge.
Journal of Pathology and Bacteriology.
Journal of Physiology.
Journal of the Royal Army Medical Corps.
Journal of Tropical Medicine and Hygiene.
The Lancet.
Lister Institute of Preventive Medicine. Report of the Governing Body.
Medical Research Council. Annual Report.
Medical Research Council. Special Report Series.
Ministry of Health. Annual Report of the Chief Medical Officer.
Ministry of Health. Special Report Series.
Monographs of the Pickett-Thompson Research Laboratory.
Physiological Abstracts.
Proceedings of the Royal Society of Medicine.
Ross Institute and Hospital for Tropical Diseases, London. Annual Report.
Transactions of the Royal Society of Tropical Medicine and Hygiene.
Tropical Diseases Bulletin.

Biology.
Annals of Applied Biology.
Bulletin of Entomological Research.
Journal of Experimental Biology.
Journal of Genetics.
Journal of Helminthology.
Parasitology.
Proceedings of the Zoological Society of London.
Protozoology.—*Journal of Helminthology.*
Review of Applied Entomology. Series B. (Medical and Veterinary).
Review of Applied Mycology.

Biochemistry.
Biochemical Journal.

Agriculture.
Agricultural Research Institutes, United Kingdom. Report on the Work. (Publ. by H.M. Stat. Office).
The Hannah Dairy Research Institute. Report for the Year.
Harper Adams Utility Poultry Journal.
Journal of Agricultural Science.
Journal of Dairy Research.
Journal of the Farmers' Club.
Journal of the Ministry of Agriculture.
Journal of the Royal Agricultural Society.
Journal of the Scottish Chamber of Agriculture.
National Farmers' Union Yearbook.
National Institute for Research in Dairying, University of Reading. Annual Report.
Scottish Journal of Agriculture.
Transactions of the Highland and Agricultural Society of Scotland.

General.
British Association for the Advancement of Science. Annual Report.
Bulletin of the Imperial Institute.
Department of Scientific and Industrial Research. Annual Report.
Department of Scientific and Industrial Research. Special Report Series.
Development Commissioners. Annual Report.
Nature.
Pharmaceutical Society of Gt. Britain. Annual Report.
Proceedings of the Royal Society of London. Series B.

NORTHERN IRELAND.

Agriculture.
Journal of the Ministry of Agriculture for Northern Ireland.

Ministry of Agriculture, Government of Northern Ireland. Annual Report.

IRISH FREE STATE.
Agriculture.
Journal of the Department of Agriculture.

OTHER COUNTRIES.
AUSTRIA.
Medicine.
Seuchenbekämpfung.

BELGIUM.
Medicine.
Annales de la Société belge de Médecine tropicale.

DENMARK.
Medicine.
Acta pathologica et microbiologica Scandinavica.
Transactions of the Scandinavian Pathological Congress.—*Acta pathologica et microbiologica Scandinavica.*

FRANCE.
Medicine.
Annales de Parasitologie humaine et comparée.
Bulletin de l'Académie de médecine.
Bulletin de la Société de Pathologie exotique.

Biology.
Annales de l'Institut Pasteur.
Bulletin de l'Institut Pasteur.
Comptes Rendus des Séances de la Société de Biologie.

Agriculture.
Le Lait.

General.
Comptes Rendus hebdomodaires des Séances de l'Académie des Sciences.

GERMANY.

Medicine.
Archiv für Schiffs- und Tropen-Hygiene, Pathologie und Therapie exotischer Krankheiten.
Beihefte zum Archiv für Schiffs- und Tropen-Hygiene.—*Ibid.*
Ergebnisse der Hygiene, Bakteriologie, Immunitätsforschung und experimentellen Therapie.
Ergebnisse der allgemeinen Pathologie und Pathologischen Anatomie des Menschen und der Tiere.
Folia Haematologica.
Reichs-Gesundheitsblatt, herausgegeben vom Reichsgesundheitsamt.

Biology.
Archiv für Protistenkunde.
Zentralblatt für Bakteriologie, Parasitenkunde u. Infektionskrankheiten. Abt. I. (Originale).
Zentralblatt für Bakteriologie, Parasitenkunde u. Infektionskrankheiten. Abt. I. (Referate).

HOLLAND.
Agriculture.
International Review of Poultry Science.

ITALY.
Medicine.
Biochimica e Terapia Sperimentale.

Biology.
Bollettino della Sezione italiana Società internazionale di Microbiologica.

POLAND.
Biology.
Rozprawy Biologiczne.

ASIA.

BRITISH EMPIRE.
BRITISH MALAYA.
Agriculture.
Malayan Agricultural Journal.

INDIA.
Medicine.
Indian Journal of Medical Research.
Indian Medical Research Memoirs.—*Indian Journal of Medical Research.*

Agriculture.
Agriculture and Livestock in India.
Imperial Council of Agricultural Research. Annual Report.
Indian Journal of Agricultural Science.
Review of Agricultural Operations in India.

OTHER COUNTRIES.
FRENCH INDO-CHINA.
Biology.
Annales de l'Institut Pasteur de l'Indo-Chine.

JAPAN.
Medicine.
Japanese Journal of Experimental Medicine.

PHILIPPINE ISLANDS.
General.
Bureau of Science, Philippine Islands. Annual Report.
Philippine Journal of Science.

AFRICA.

BRITISH EMPIRE.

GAMBIA.

Agriculture.

Department of Agriculture. Annual Report.

KENYA.

Medicine.

East African Medical Journal.

Biology.

Colony and Protectorate of Kenya, Game Department. Annual Report.

General.

Natural History Magazine. Kenya and Uganda.

SOUTHERN RHODESIA.

Agriculture.

Rhodesia Agricultural Journal.

TANGANYIKA TERRITORY.

Biology.

Tanganyika Territory. Tsetse Research Annual Report.

UGANDA.

Biology.

Uganda Protectorate, Game Department Annual Report.

UNION OF SOUTH AFRICA.

Medicine.

South African Medical Journal.

Agriculture.

Farming in South Africa.

General.

Reports of the South African Association for the Advancement of Science.

OTHER COUNTRIES.

ALGERIA.

Biology.

Archives de l'Institut Pasteur d'Algérie.

BELGIAN CONGO.

Agriculture.

Bulletin Agricole du Congo Belge.

MOROCCO.

Medicine.

Maroc Médical.

TUNIS.

Biology.

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Stock Inspector's Annual Report. Stock Department.

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Agricultural Gazette of New South Wales.

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South Australia. Annual Report of the Minister of Agriculture.

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Index Medicus, *Biological Abstracts* and the *Index Catalogue to the Surgeon General's Library, U.S.A.*, are used extensively in the Bureau Library, but are not searched for current indexing purposes.

DISEASES CAUSED BY BACTERIA AND FUNGI.

—. (1931). Preussen. Runderlass des Ministers für Landwirtschaft usw. über Feststellung des gelben Galtes in Milchtierbeständen. Vom 1. Juni 1931. [**White Paper from the Minister for Agriculture, etc. on the Recognition of Chronic Bovine Streptococcic Mastitis in Dairy Herds. June 1st, 1931**].—*Reichsgesdhbl.* **6.** 458-459.

The methods recommended are as follows :—(1) Clinical examination by veterinary surgeons. Attention is to be paid to general health, but especially to a comparison of the gross characters of quarter samples from each cow. In the case of the so-called rapid methods of diagnosis [reaction, catalase, chlorides, etc.] a comparison is also recommended ; (2) Bacteriological examination in veterinary laboratories. In the case of bulk samples the presence of numerous polynuclear leucocytes is to be regarded as highly suspicious and the presence of mastitis secretion established if, together with few or many leucocytes, streptococci with some or all of the following characters are found :—the long axis of the cocci is across the chain ; the cocci are usually large, swollen, badly stained or appear to be separated by a capsule. Length of chain is of no importance, but short forms are frequently found in leucocytes. Souring streptococci have not these characters.

Mixed samples from the quarters of one cow are to be judged by the same criteria. They are to be taken with all precautions, cooled, preserved with boric acid if necessary in any particular case and examined as expeditiously as possible ; under these conditions atypical streptococci may be considered. If, in the presence of increased leucocytes, mastitis streptococci are not found, another sample should be examined within 14 days.

Samples from a diseased quarter must always be taken separately and, if no streptococci are found microscopically, another sample should be taken and examined culturally.—A. W. Stableforth.

—. (1931). **A Survey of the Immunisation of Cattle against Tuberculosis.**—*Lancet.* **220.** 826-829 and 879-881. [28 refs.]

This is a survey of the different methods which have been tried for the immunization of cattle against tuberculosis.

The subject matter is divided into four main groups :—

(a) Vaccines made from tuberculins and the various split products of the tubercle bacillus and dead bacilli.

(b) Vaccines containing tubercle bacilli of strains other than bovine, e.g. acid-fast bacilli of cold-blooded animals and avian and human strains of *M. tuberculosis*.

(c) Vaccines containing living bovine tubercle bacilli.

(d) Vaccines the precise nature of which is unknown.

The author expresses surprise at the meagre amount of work which has been carried out to ascertain the value of Koch's " old tuberculin " for the protection of cattle. M'Fadyean was the pioneer of this method and details are given of his experiments, but neither in his work nor in that of Calmette and Guérin was a sufficient number of experimental animals employed to rule out the usual complicating factors and permit of a definite conclusion as to the value of the method. The author states that he has been unable to find any reference in the literature to experiments on the immunizing value of new tuberculin, but he points out that, in the opinion of Calmette, tuberculin having no toxic action on the healthy body has little if any effect in increasing resistance.

Various workers, notably CALMETTE and VALLÉE, have attempted immunization with the products of tubercle bacilli broken up by various ingenious expedients, but the results obtained were not sufficiently encouraging to justify further investigation. It has been shown that dead tubercle bacilli will confer some degree of protection on guinea pigs, but the duration of the protection is short. VALLÉE, CALMETTE and GUÉRIN have tested dead vaccines on bovines, but the method was abandoned as being of no practical value. Nathan RAW employed a vaccine containing heated tubercle bacilli of human origin for the immunization of calves, but there is no reliable evidence to show that it is of any practical value. Reference is made to FRIEDMANN'S vaccine, prepared from a strain of acid-fast bacillus isolated from a sea-turtle and, although encouraging results have been claimed for it in the immunization of cattle, the concensus of opinion is that it is of little if any value.

M'FADYEAN, SHEATHER, EDWARDS and MINETT tested the possibility of living avian tubercle bacilli as a vaccine. They found that, although the degree of immunity produced by the avian bacilli was somewhat less than that which followed the inoculation of human bacilli, it nevertheless conferred a definite degree of resistance to a subsequent test dose of bovine bacilli. [More recent observations have shown that certain strains of avian tubercle bacilli may give rise to a certain mortality when inoculated into cattle].

In 1902, VON BEHRING introduced a vaccine containing a human strain of tubercle bacillus which had become attenuated for guinea pigs as the result of prolonged cultivation on artificial media. Discordant results were reported from the use of this vaccine which were, in the opinion of CALMETTE, the result of the vaccine not being of uniform virulence.

The British Royal Commission on Tuberculosis carried out a series of experiments on cattle with a vaccine containing living human tubercle bacilli. It was found that, by the inoculation of large doses of this vaccine, a degree of resistance could be established sufficient to protect against a dose of virulent bovine bacilli which caused fatal tuberculosis in unprotected control animals.

The author describes some of the principal experiments carried out by CALMETTE, GUÉRIN and others with BCG vaccine, and in conclusion points out that it is clear in the light of existing knowledge that immunization by tuberculin, bacillary products and dead bacilli confers only a short period of protection ; that even then the results are uncertain and that the results obtained with vaccines prepared from strains of acid fast bacilli from cold-blooded animals have not been sufficiently good to justify further tests.—T. M. DOYLE.

MOUSSU, G. (1931). Vaccination anti-tuberculeuse par le B.C.G. Le B.C.G. peut-il reprendre de la virulence ? [**Anti-tuberculous Vaccination by BCG ; can BCG regain Virulence ?**].—*Rec. Méd. vét.* **107.** 449-457. [1 ref.]

The author describes a cold abscess that appeared at the base of the neck in a heifer 11 months after vaccination with BCG into the dewlap. By inoculating guinea pigs with caseous material taken from the depths of the abscess he obtained a strain of tubercle bacillus that behaved as an ordinary virulent bovine bacillus. He discusses the possibilities of the infection being due to the vaccine or to other causes and deplores the fact that large scale experiments have not been carried out to determine whether BCG is efficacious in animals and whether it is always innocuous.—NORMAN HOLE.

CARNE, H. R. (1932). **Caseous Lymphadenitis : Ingestion as a Method of**

Infection of Sheep with the Preisz-Nocard Bacillus. The Growth of the Preisz-Nocard Bacillus in Sheep Faeces.—*J. Sci. & Indust. Res. Australia.* **5.** 98-102 and 103-109. [10 refs.]

If lesions connected with the alimentary tract can be accepted as a criterion of the method of infection, natural infection of sheep by ingestion is uncommon. In experimental infections by this route, lesions are usually confined to lymphatic glands draining from the buccal cavity, as conditions in the caudal portion of the bowel are apparently not suitable for the penetration and production of lesions by *Corynebacterium pseudotuberculosis ovis*. Experimental evidence showed the gastric juice of sheep to have a variable action on the organism, but attempts to infect *per rectum* were unsuccessful.

Sheep fed on nitrogenous food excrete faeces, which, when sterilized, support the growth of *C. pseudotuberculosis ovis*. In unsterile conditions the organism is probably overgrown by others in faeces, but until it has been proved to the contrary, precautions must be taken against sheep faeces as a possible vehicle of infection.—Norman Hole.

Magnusson, H. (1931). Hönstyfus och vit diarré hos kyckling. [**Typhoid in Hens and White Diarrhoea in Chickens**].—*Svensk Vet.-tidskr.* **36.** 1-21.

The author gives a good account of white diarrhoea in chickens. In connection with control, he says emphatically that on account of its nature it should not be included under the rigorous laws which apply to fowl plague and fowl cholera. The work should be taken up by poultry breeding societies on a voluntary basis and be organized in such a way that the disease is first eradicated from the select livestock. The breeder should be enlightened as to the nature of the disease and its capacity for causing loss, and be urged to take the utmost precaution in buying eggs, chickens and fowls when these are acquired from stocks that have not been tested. The blood test is the best-known method for detecting infected birds.

It should be compulsory that annual blood tests of all birds over six months old should be carried out in flocks advertised as healthy.—N. Lagerlöf (Stockholm).

Warrack, G. H., & Dalling, T. (1931). **The Transmission of Pullorum Disease (Bacillary White Diarrhoea) among Adult Stock.**—*Vet. J.* **87.** 24-27. [8 refs.]

The evidence relating to this question is contradictory and the authors are, therefore, carrying out a controlled experiment, mixing reactors with non-reactors from a source known to be free of the disease. The experiments are not complete, but the data accumulated are of significant interest. They mixed some reactors and non-reactors in a large pen (about 20 sq. yds. of run per bird) and some in a small pen (about 3½ sq. yds. of run per bird); the results indicate that non-reactors may become reactors when mixed with reactors if the space the birds occupy is small. Two methods of agglutination testing were used, the water-bath at 50° C. for 4 hours, and the rapid shake method. Kerr has shown *Bact. pullorum* to be voided in the excreta of reacting fowls, and Dalling, Mason and Gordon have been able to infect healthy birds *per os* and recover the organism from the ovary. It seems probable, therefore, that the oral route is the one followed in such natural infections.—Norman Hole.

Wall, S. (1932). Den smittsamma nötkreaturskastningens förlopp i en större besättning. [**The Course of Infectious Abortion in a Large Herd of Cattle**].

—*Skand. Vet.-tidskr.* **22.** 153-199. 13 tables. [Summary in English : abst. from orig.]

During the years 1924 to 1931 the author followed the course of infectious abortion in a large herd of cattle which had been infected with Bang's disease since 1900, with periods of a high abortion frequency in 1902 to 1903, 1908 to 1911 and 1914 to 1916. In 1924 seven cases of abortion occurred, in 1925, 65 cases and in 1926, 105 cases. Since then the number has decreased fairly regularly and in 1931 there were only 14 cases.

The disease appeared in the herd in cycles of three separate stages, first an introductory stage lasting one year, secondly a spreading stage of two years duration and thirdly a retrogressive stage which has now lasted five years.

The author considers that the retrogression of the disease was due to acquired immunity and loss in virulence of the bacilli. Treatment with dead vaccine was found to be injurious to infected animals and to increase the percentage of abortions, but it seemed to immunize the non-infected animals to some extent.

In infected herds all the animals should be given dead vaccine at the same time and, after some immunity has been acquired, this should be followed up by a dose of a weak, well-known live culture vaccine to the cows which are not pregnant.

The isolation method, based upon regularly repeated blood tests, can be employed to advantage during the early stage of herd infection and in later stages when the disease is retrogressing.—N. Lagerlöf (Stockholm).

Jensen, C. O. (1931). Ueber die Bekämpfung des infektiösen Rinderabortus in Dänemark. [**On the Campaign against Bovine Contagious Abortion in Denmark**].—*Deuts. tierärztl. Wschr.* **39.** 733-737.

The author traces the history of attempts to control bovine contagious abortion in Denmark. The disease was first made notifiable in 1920 ; the law was revised in 1927 and compels cattle owners to isolate all bulls, cows and heifers for a certain time after a case of abortion has been observed. The animals may not be sold for meat and must have no contact with other herds.

Free diagnostic work in connection with the disease is done by the State Veterinary Service and the entire control scheme in Denmark now hangs on the regulations outlined above. Considerable work on vaccination has been performed in Denmark for many years and the author makes frequent reference to this, but unanimity on the value of vaccines has not yet been achieved. Jensen is rather sceptical about the value of live vaccines and considers them overrated.

[At the end of this article is the report of a discussion on papers on bovine abortion presented at the 6th meeting of the veterinarian specialists concerned with diseases of breeding animals held at Leipzig on Oct. 3rd, 1931. Three other papers are concerned—those by Zwick, by Ziegler and Teichmann and by Götze and Müller. For abstracts of the originals see this *Bulletin*. **2.** 208 and 269]. In the discussion Poppe pointed out the importance of continuous excreters of the organism and of the manner in which vaccines should be prepared. Much care should be employed to ensure that the strains used are of a uniform virulence as shown by the results of tests on guinea pigs. [Details on this matter are embodied in the recommendations of the Abortion Commission of the German Imperial Centre for the Campaign against Diseases of Breeding Animals—see this *Bulletin*. **2.** 540]. Poppe also reported work on antibodies : he had found that, when inoculated with live cultures of *Br. abortus*, immature cattle produced antibodies to a far greater extent than mature beasts. He considered that this observation should revive interest in the vaccination of calves. As regards human infection with *Br. abortus*, he considered that the danger of transmission is slight.

Miessner spoke in support of live vaccines and expressed the opinion that an adequate interval between the last vaccination and conception is of the utmost importance.

Zeller showed the geographical occurrence in Germany of the 626 cases of *Br. abortus* infection in man reported to date.

Bendixen reported that he and O. Bang had found that *Br. abortus* can traverse the healthy skin of cattle and set up infection. He gave a brief account of four experiments.

Damm laid stress on the value of hygienic measures in abortion control and referred to dietetics in relation to the disease.

Zwick stated his belief that the present Danish system of control is unsuitable for Germany and that live vaccination has an important place in control in the latter country. He referred to the findings of Cotton and Holth that *Br. abortus* can pass through mucous membranes including that of the eye. Witte has recently obtained good results with the Meinicke diagnostic reaction which is simpler than the ordinary agglutination test ; it was found to be as efficient as the latter in 400 cases.

Götze advised the use of fishmeal (100 g. daily per head) for cattle when dealing with abortion control.—J. E.

Hultén, O. (1931). Undulantfeber hos människa—infektionsrisk för nötkreatur ? [**Undulant Fever in Man, Risk of Infection for Cattle ?**]—*Svensk Vet.-tidskr.* **36.** 208-213.

The author made blood tests of all the animals in a large herd of cattle in which infectious abortion was unknown and obtained negative results in every case. Five months later a cow aborted and the case was diagnosed as Bang's disease. Some time later another cow aborted and, eight months after the first case of abortion, six of the herd of 53 animals showed a positive blood reaction. The herd had been protected against infection in every way and the author considered it quite impossible for infection to have been conveyed to the farm through direct or indirect contact with other animals.

On further investigation it was found that five months before the occurrence of the first case of abortion, a new milkmaid had been employed on the farm. Some months earlier she had spent a long time in hospital suffering from undulant fever. She was still being treated for anaemia and one year after the first attack of the illness she had a relapse while on the farm. The author is of the opinion that the source of infection in the herd was to be found in the infected milkmaid.

—N. Lagerlöf (Stockholm).

Frei, W. (1932). Ueber eine Abortusenzootie bei Mutterschweinen mit Uebergang von Bangbazillen auf den Menschen. [**On an Enzootic of *Br. abortus* Infection in Sows with Passage of the Bacilli to Man**].—*Schweiz. Arch. Tierhlk.* **74.** 120-126. 1 table. [2 refs.]

During the winter 1930-1931, an outbreak of infectious abortion of swine occurred in a village in northern Switzerland. Unfortunately the author only got in touch with the outbreak towards its end and so was unable to obtain much material for examination. The outbreak, which involved 110 sows and 3 boars, affected 11 of the villagers.

Frei was able to obtain positive agglutination reactions for *Br. abortus* with material from one boar and two sows and the organism was isolated from five foetuses and from the boar.

The clinical course of the disease, both in swine and in human beings, was

described by NAGEL [see this *Bulletin*. **2.** 436].—J. E.

DIBLE, J. H., & POWNALL, M. (1932). **The Evidence of *Brucella abortus* Infection in Slaughterhouse Men.**—*J. Hyg. Cambridge*. **32.** 349-353. 5 tables. [17 refs.]

The authors state that :—

" It is evident that in a certain small percentage of ' normal ' subjects some agglutinins for *Brucella* are commonly to be found ; the incidence of these depending upon the titre accepted as significant, which varies widely with different workers. . . . It is clear, however, that there is a notable association between occupation, and the chances of infection, with the incidence and strength of these agglutinins."

As a result of their investigations the authors find that :—

" Men engaged in slaughtering and dressing meat show a higher incidence of *Brucella abortus* agglutinins than those in similar age and sex groups who are otherwise employed, where titres of 1 in 20 and upwards are observed.

" This applies especially to men who deal with cattle and sheep ; no such increased incidence has been noted in men dealing with pigs.

" It would seem that a titre in the vicinity of 1 in 40 serves to indicate evidence of *Brucella* infection definitely greater than that to be found in the generality of the community."

—LL. E. W. BEVAN.

NEWSOM, I. E., & CROSS, F. (1932). **Some Bipolar Organisms found in Pneumonia in Sheep.**—*J. Amer. Vet. Med. Ass.* **80.** 711-719. 3 tables. [6 refs.]

The authors have made a biochemical and serological study of 20 strains of a bipolar organism from cases of pneumonia in sheep and 6 from pneumonia in cattle. For comparison, representatives of *Pasteurella* (Jones' Groups I and III) were used as well as cultures from a fowl and a rabbit. References are given and the conclusion is reached that it is undesirable to classify the genus *Pasteurella* on the basis of host specificity. On the basis of indol formation, haemolysis and rabbit virulence all except two of their cultures fell into two groups. The typical strains, including a Group III strain of Jones, produced indol, were virulent for rabbits, but did not haemolyse rabbit blood cells. The atypical strains including a Jones' Group I strain failed to produce indol and were haemolytic, but were not virulent for the rabbit. It is suggested that this atypical group be given a species name *Pasteurella haemolytica*. No cross agglutination occurred between typical and atypical strains and various sera. By agglutination each group could be divided into two sub-groups.—R. LOVELL.

DUNGAL, N. (1931). **Contagious Pneumonia in Sheep.**—*J. Comp. Path. & Therap.* **44.** 126-143. 4 figs., 6 tables. [17 refs.]

The author investigated an outbreak of pneumonia in sheep which had caused severe losses during the previous three years in Iceland. The disease occurred at any time from the autumn to the spring when the sheep were housed ; it appeared suddenly and affected animals died within one or two days or even in 12 hours after first showing symptoms of illness.

Recovery was exceptional. The characteristic picture at *post-mortem* examination was a pneumonia affecting principally those parts most closely connected with the trachea, i.e. the anterior right lobe was nearly always involved and usually only a minor part of the total lung tissue was consolidated. The consolidation was characteristic, was sharply demarcated from unaffected lung tissue and the colour varied from shades of red to grey. The pleura covering affected lung tissue was only slightly thickened and remained clear ; the trachea and bronchi were congested. Subepicardial petechiae were often seen in the heart. The

parenchymatous abdominal organs showed some congestion and enlargement of the gall bladder was nearly always present.

The histological appearances of affected lung are described in detail.

The bacteriology of the disease was studied closely and an organism roughly similar to pasteurella was found to be the cause. Cultures isolated from natural cases reproduced the disease in healthy sheep. Rabbits, guinea pigs, dogs, cats, pigeons, mice and a pony were artificially infected [method not stated], but the mice alone succumbed and the pony was ill for a few hours only.

As a result of the experiments he carried out, the author was satisfied that natural infections can be conveyed from flock to flock by healthy carriers of the organism. After preliminary experimental work a dead vaccine (12-hour broth culture killed by 0·4 per cent. phenol) which caused no post-inoculation trouble was prepared on a large scale and 50,000 sheep were given two inoculations at an interval of a week. Owing to the difficulty of obtaining controls it was impossible to estimate the value of the vaccine, but, judging from the course of the disease among all the flocks treated, it was a great success and losses practically ceased.

—J. E.

Kranefeld, F. C. (1931). Anaerobe bacillen en de door hen Veroorzaakte Infecties bij de Huisdieren in Nederlandsch-Indië. III. Onderzoek in het laboratorium. [**Anaerobic Infections of the Domesticated Animals in the Dutch East Indies. III. Laboratory Experiments**].—*Ned.-Indisch. Blad. Diergeneesk.* **43.** 601-614. 1 table.

The author describes the technique employed in the laboratories at Buitenzorg for the cultivation of anaerobes. This closely resembles Zeissler's method.

—A. Leslie Sheather.

Dungal, N. (1932). Recherches bactériologiques sur le bradsot du mouton islandais. Pathogénie et vaccination. [**Bacteriological Research on Braxy in Icelandic Sheep. Pathogenesis and Vaccination**].—*Ann. Inst. Pasteur.* **48.** 604-616. 4 tables. [1 ref.]

The great majority of cases of braxy in Iceland sheep are caused by *Clostridium septique*. The author recommends a vaccine made by adding 0·25 per cent. formalin to 24-hour cultures of the organism and then keeping for 48 hours in the incubator. This has afforded more protection in sheep, guinea pigs and mice than a 0·5 per cent. formol vaccine. Some mortality does occur as a result of the vaccination, but several thousand sheep were vaccinated by this method in 1929 and 1930, with results which compared very favourably with those obtained under similar conditions by the Danish method of serum-vaccine inoculation. About 25 per cent. of non-vaccinated lambs succumb yearly in Iceland, but in 1930 only 1·22 per cent. of vaccinated animals died.—Norman Hole.

Oxer, D. T. (1931). **Black Disease in Tasmania.**—*J. Sci. & Indust. Res. Australia.* **4.** 36-44. 3 tables. [13 refs.]

A description of investigations into the aetiology of an acute enzootic disease of Tasmanian sheep. It is concluded that the disease is identical with that known as black disease or " infectious necrotic hepatitis " on the Australian mainland, and that, as in that disease, the causal organism is *Clostridium oedematiens*.

—R. S. Roberts.

Jansen, J. (1932). Infectie door Bac. Novy bij een Schaap. [**A Sheep infected with Novy's Bacillus**].—*Tijdschr. Diergeneesk.* **59.** 174-179. 2 plates.

A sheep showing great dulness, inappetence and cessation of rumination

was under observation for three days prior to death, during which time the temperature rose from 39·8° to 41·2° C. and then fell again to 40·5° C. If lifted the animal was able to stand, but it rested against the wall. The most striking symptom was swelling of the head, which was so pronounced as to cause almost complete closure of the eyes. The condition resembled the " geeldikkop " of South Africa. Liquid had oozed through the skin of the head at places and had dried to form crusts or scabs.

The animal was found dead on the morning of the fourth day. Microscopic examination of the oedematous fluid, which was not haemorrhagic, showed that Gram-positive cocci and bacilli were present. Preparations from the deeper tissues showed that a Gram-positive sporulating bacillus was present. The organism was polymorphic, some forms were slender and cylindrical and others swollen ; the spores were wider than the bacilli. Long and short chains were present. In the latter some of the elements appeared to be Gram-negative. No capsules could be demonstrated by staining.

Cultural and biological tests led the author to form the opinion that Novy's bacillus and the bacillus of malignant oedema were both present. He is inclined to think that Novy's bacillus was the primary infection because of the absence of any haemorrhagic appearance of the oedematous fluid. He suspects, however, that both organisms were present during the course of the disease. It should perhaps be noted that it is not recorded, and probably not known, what interval elapsed between death and the examination.—A. Leslie Sheather.

Dalling, T. (1932). **Discussion on *B. welchii* Infections in Animals and Man.**—*Proc. Roy. Soc. Med. London.* **25.** 807-811.

The question of true *Clostridium welchii* infections in animals is dismissed with short references to gas gangrene infections following contamination of antigens with *Cl. welchii*, toxaemia from *Cl. welchii* arising in an already diseased intestine in poultry and the possibility of this bacillus being concerned in the aetiology of some cases of blackquarter in cattle and in sheep. The author then proceeds to discuss the bacteriology of those diseases of animals which are caused by organisms closely related to but immunologically distinct from *Cl. welchii*.

Referring to the bacillus of lamb dysentery it is stated that this organism has a more potent toxin than has ever been encountered from this strain and that its antitoxin protects against the homologous toxin and against that of *Cl. welchii*, whereas *Cl. welchii* antitoxin fails to neutralize the toxin of the lamb dysentery bacillus. It does, however, neutralize the haemolysin component of the lamb dysentery toxin.

The bacillus of lamb dysentery and *Cl. paludis* McEwen are said to be similar in antigenic reactions, but it is stated that the latter ferments glycerol and that the former fails to do so.

A strain of the bacillus described by Bennetts as causing an entero-toxaemia or " braxy-like " disease of sheep in Australia had been examined and compared with *Cl. welchii*, the bacillus of lamb dysentery and *Cl. paludis*. Antigenic reactions and fermentation tests showed this to be identical with *Cl. paludis*. —R. S. Roberts.

Mason, J. H., Ross, Helen, E., & Dalling, T. (1931). **B. paludis McEwen—A Comparison with the Lamb Dysentery Bacillus.**—*J. Comp. Path. & Therap.* **44.** 258-265. 6 tables. [3 refs.]

In this paper the authors publish an account of a series of comparative examinations of the bacillus of lamb dysentery, *Clostridium welchii* and

Cl. paludis described by McEwen in 1930.

In 1928 [*Vet. Rec.* **8.** 841.] the authors summarized the differences which they found between the first two organisms mentioned above, as regards toxin, antitoxin, growth on solid serum, in alkaline egg medium, the action upon glycerin and the production of acrolein. These tests have been repeated including McEwen's *Cl. paludis*. The authors find that *Cl. paludis* produces a toxin as powerful as any they had previously produced with the lamb dysentery bacillus, and far more potent than those produced by *Cl. welchii*.

The antitoxins of *Cl. paludis* and the lamb dysentery bacillus neutralized all three toxins, but *Cl. welchii* antitoxin was strictly specific. *Cl. paludis* anaculture was found to protect guinea pigs against far larger doses of lamb dysentery toxin than lamb dysentery anaculture.

The haemolysin present in *Cl. paludis* culture appears to be identical with that present in lamb dysentery and *Cl. welchii* cultures.

The effect of the growth of *Cl. paludis* on solid serum and on alkaline egg appears to be the same as the action of the lamb dysentery bacillus. *Cl. paludis* has the same range of fermentative action as the lamb dysentery bacillus except that it causes fermentation of glycerine. In this respect it agrees with *Cl. welchii*. Further both *Cl. welchii* and *Cl. paludis* produce acidity in fermentation reactions as indicated by reddening of litmus, whereas lamb dysentery bacillus does not. *Cl. paludis*, like *Cl. welchii* and unlike the lamb dysentery bacillus, produces the aldehyde and acrolein.—A. Leslie Sheather..

Thompson, W. W., & Fabian, F. W. (1932). **Molds in Respiratory Tract of Chickens.**—*J. Amer. Vet. Med. Ass.* **80.** 921-922.

Two cases of respiratory disease in chickens are described. In both cases *Penicillium glaucum*, *Rhizopus nigricans* and *Aspergillus niger* were isolated. The first-named was found in all parts of the respiratory organs including the left abdominal air sac in both chicks ; the second was found in the trachea and bronchi only in one case and in the lungs only in the other case ; the third was found in the lungs only in each case.—J. E.

Awrorow, A. A. (1932). Ein Fall von Nierenaktinomykose beim Rindvieh. [**A Case of Actinomycosis of the Kidney in a Bovine**].—*Berl. tierärztl. Wschr.* **48.** 434-435. 1 fig.

After a useful literary review of the incidence of renal actinomycosis in domestic animals, the author describes a case.—J. E.

DISEASES CAUSED BY PROTOZOAN PARASITES.

van Dulm, J., & le Coultre, A. P. (1932). Mededeelingen uit de Practijk omtrent Surra bij den Hond. [**Cases of Surra in Dogs encountered in Practice**].—*Ned.-Indisch. Blad. Diergeneesk.* **44.** 25-32.

The authors record eight cases of surra in dogs, seven of which appear to have been caused by the ingestion of blood and raw meat of buffaloes killed at the slaughterhouse. In the eighth case there was no evidence regarding the method of infection. Intravenous injection of naganol gave good results, but it did not effect a cure in every case.—A. Leslie Sheather.

I. Bonacci, H. (1931). Nouveaux milieux de culture pour le *Trypanosoma cruzi*. [**New Media for the Cultivation of** *Trypanosoma cruzi*].—*C. R. Soc. Biol. Paris.* **107.** 747-748.

II. Dias, E. (1932). Le *Trypanosoma cruzi* pendant les premières phases de l'infection expérimentale. [*Trypanosoma cruzi* **during the Early Phases of Experimental Infection**].—*Ibid.* **110.** 203-205.

III. Dias, E. (1932). Le *Trypanosoma cruzi* et ses rapports avec le système réticulo-endothélial. [*Trypanosoma cruzi* **and its Relationships to the Reticulo-endothelial System**].—*Ibid.* 206-210. 3 figs.

I. The author gives formulae for the following three media which have proved successful :—

(a) To 100 c.c. of 1 per cent. agar containing 1·5 per cent. peptone, and melted at 50° C., add 1 c.c. of 50 per cent. glucose and 5 c.c. of blood from a young guinea pig. Distribute into tubes in 5 c.c. amounts, slope and incubate at 37° C. to get the maximum amount of water of condensation.

(b) To agar [100 c.c. ?] containing 2·5 per cent. peptone and 0·7 per cent. salt, add 1 c.c. of 50 per cent. glucose and 5 c.c. of blood from a young guinea pig. Proceed as in (a).

(c) The best results were obtained with this medium which differed from (b) only in that it contained 3 per cent. peptone.

II. In experimental animals the parasite makes its appearance in the blood in from 45 minutes to two and three quarter hours after inoculation, the interval depending upon the method of inoculation. The number present in the blood stream remains practically constant for four days and a marked increase then occurs. This increase is due to the liberation of flagellates which have undergone development in the tissues.

The parasites in the blood during the first few days are for the most part slender and very active, but swollen and granular forms may be encountered. The intracellular cycle of development requires five days.

III. In Chagas disease the parasites, at least in the early stages of infection, have a special affinity for the cells of the reticulo-endothelial system. This system includes the histiocytes of the subcutaneous tissue, which has been termed the external reticulo-endothelial system. It would seem that after the lapse of a certain length of time the parasites are able to pass on to the invasion of other cells in the body such as striped and smooth muscle and cardiac muscle. Multiplication of the parasites in the reticulo-endothelial system leads to a blockage of the system.

The author's experiments have had for their object the study of the possibility that blockage of the system by parasites and by colloidal solutions might be reciprocal. Local blockage of the peripheral reticulo-endothelial system by parasites was effected by subcutaneous inoculation of dogs. Five days later various colloidal solutions were injected at the same place. Some of the parasitized cells were found to have retained the power of flocculating the colloids. The reverse experiment was tried. An infected dog was injected intravenously with collargol and on the following day it was found flocculated in parasitized Küpffer cells. Not all the invaded cells showed flocculation and it is possible that some of them may have lost the power wholly or in part.

By injecting colloids intravenously and intraperitoneally complete blockage was effected. Inoculation with trypanosomes some days later led to their appearance in the blood on the tenth day. No parasitized cells could be found in the organs when death occurred on the following day. No rigid conclusions are drawn from this experiment because only a small dose of trypanosomes was used and its virulence was not known.—A. Leslie Sheather.

Nattan-Larrier, L., & Noyer, B. (1932). Ultrafiltration et pouvoir protecteur

des immun-sérums anti-trypanosomes. [**Ultrafiltration and the Protective Power of Anti-trypanosome Immune Sera**].—*C. R. Soc. Biol. Paris.* **109.** 702-704. [2 refs.]

In previous papers the authors published the results of their experiments regarding the ultrafiltration of the anti-trypanosome substances present in normal human serum. The present paper contains the results of their experiments with sera from infected animals, the object being to determine whether anti-trypanosome substances would pass a collodion filter.

The results showed that, contrary to the case with normal serum, the immune bodies in the serum of infected animals are not capable of passing through collodion filters. Complement, the natural anti-sheep haemolysin present in human serum, anti-syphilitic sensitizer and anti-sheep haemolysin obtained from rabbits are all arrested by the collodion filters.—A. Leslie Sheather.

Walker, J. (1931). **Research. East Coast Fever.**—*Ann. Rep. Dept. Agric. Kenya, 1930.* pp. 100-108.

The object of this research was to find material which would invariably produce a reaction leading to immunity without causing a high mortality. The only known reliable means of transmitting East Coast fever is by using infected ticks, but these cause a high mortality. Extract of infected spleen and blood made with distilled water and used in large doses conferred no immunity.

Emulsion of ticks in bovine serum (1 c.c. serum per tick) was tested in doses varying from 5 to 30 c.c. The emulsion was made from unfed nymphs which had been fed as larvae on an infected animal. The results were irregular, but when reactions occurred the mortality was very high (100 per cent.). The serum of immune cattle was tested for curative and protective properties, in the hope that it might be used to modify reactions, but even with a dose of 900 c.c. it was ineffective.—U. F. Richardson.

Nieschulz, O., & Wawo-Roentoe, F. K. (1931). Einige Versuche mit Piroplasma canis und Rhipicephalus sanguineus. [**Some Experiments with *Babesia canis* and *Rhipicephalus sanguineus***].—*Zschr. Infektkr. Haust.* **40.** 60-63. [1 ref.]

Yakimoff, W. L., Amanschuloff, S. A., Arbusoff, P. N., & Samarzeff, A. A. (1931). Die Hundepiroplasmose im Kreise Uralsk (Russland, U.d.S.S.R). [**Canine Babesiasis in the Ural Districts of Russia**].—*Berl. tierärztl. Wschr.* **47.** 425-426.

The first article reports failure to transmit a strain of *B. canis* with *Rh. sanguineus*. The authors ascribe the failure to the repeated transmission of the strain by subinoculation over a prolonged period.

The second article describes two cases of canine babesiasis and their successful treatment with Fourneau 270.—U. F. Richardson.

Ducloux, M. E., & Cordier, G. (1931). L'anaplasmose bovine expérimentale en Tunisie. [**Experimental Bovine Anaplasmosis in Tunis**].—*Rev. vét. et J. Méd. vét.* **83.** 425-446 and 495-507. 17 figs., 9 tables. [10 refs.]

Dikmans. G. (1931). **The Question of Prenatal Infection in Anaplasmosis.**—*North Amer. Vet.* **12.** No. 9. 21-23. [5 refs.]

The first paper records the results of inoculating imported cattle, local cattle and locally-bred zebu cattle in Tunis with blood from an animal harbouring *Babesia bigemina*, *Theileria mutans* and *Anaplasma marginale*. The zebus proved refractory to *B. bigemina* although the possibility of residual immunity from previous

infection was excluded by a test of their blood on imported animals. They also showed a milder reaction to anaplasmosis than the other groups. [The numbers used were, however, too small to exclude the possibility that the resistance was individual]. Tests as to the quantity of bilirubin and cholesterol in the blood and the resistance of the red corpuscles to haemolysis were carried out. The quantity of bilirubin and the fragility of the red corpuscles increased with the severity of the anaplasmosis and these tests may be of value in prognosis. An attack of Tunisian anaplasmosis immunized against further infection, but vaccination with Algerian vaccine, though causing severe reaction, did not prevent a later Tunisian infection.

Attempts at immunization were not satisfactory and although success is recorded in the treatment of early cases (notably with saline infusion) the author concludes that, owing to the difficulty of early diagnosis, the best hope of reducing losses is to attempt to produce a resistant breed by an intermixture of zebu blood.

The second paper criticizes the claim of the Oklahoma Agricultural College that anaplasmosis had been transmitted by biting flies (*Tabanus* and *Chrysops*) to a cow from a bull which had been infected pre-natally. Prior to use for experiment the bull had been inoculated with blood containing anaplasms and although no organisms were detected the infection of the cow may have been derived from this source. The question of the occurrence of pre-natal infection is discussed and it is pointed out that anaplasm-like bodies have been recorded as being found in young rats, guinea pigs, goats and normal calves.—U. F. Richardson.

DISEASES CAUSED BY FILTRABLE VIRUSES.

Forssman, J., Höjer, J. A., Lavesson, L., Sandgren, M., & Magnusson, H. (1931). Utredning angående mul-och klövsjukans spridningssätt och smittvägar under nuvarande epizooti. [**Investigation of the Spread of Foot and Mouth Disease and the Manner in which it occurred during the Recent Outbreak**].—*Svensk Vet.-tidskr.* **36.** 213-220.

This is a report of the Committee of the Royal Swedish State Department of Health on foot and mouth disease in Skåne.

During the period from the 4th December, 1929 to the 22nd December, 1930, 11 outbreaks of foot and mouth disease occurred in the county of Malmöhus, two in the county of Kristianstad and one in the county of Blekinge. All cloven-footed animals were immediately slaughtered, the carcasses were properly dealt with and the farms were thoroughly disinfected. The Committee doubts if virus carriers have existed since the big outbreak in 1924 to 1927 when 11,000 farms in the south of Sweden were infected. The fact that from 1927 until the end of 1929 no cases occurred in Sweden indicates that no chronic virus carriers existed. According to investigations made at the time, it was found that the outbreak of 1926 to 1927 was caused by the Vallée A type of virus, whereas in 1929 and 1930 it was caused by the Vallée O type. This points to newly-imported infection. The Committee states that during the latter part of 1929 there was a widespread outbreak of foot and mouth disease in Northern Germany. The outbreak spread very rapidly in Germany after September 1929, and in December over 5,000 farms were infected. Between the 29th November and the 2nd December, 1929, cases of foot and mouth disease occurred on four farms in Denmark. Denmark was, therefore, infected immediately before outbreaks occurred in Skåne. It should be noted that the outbreak in Germany was most intense on the northern coast from which there is regular communication with

both Denmark and Skåne and the Committee considers that the contagion was brought to Skåne from the neighbouring countries. A great deal of work has been done to find out how the infection reached Sweden, but no definite information has been obtained.

The Committee emphasizes the great superiority of the stamping-out method in comparison to the isolation method at the beginning of an outbreak when there is still a possibility of complete eradication.

If the stamping-out method is to be really effective slaughter must be done extremely quickly so that all opportunity for spread of infection is prevented. —N. LAGERLÖF (STOCKHOLM).

MACKESSACK, G. R. (1932). **Imported Meat in Relation to Foot and Mouth Disease.**—*J. Scot. Chamber Agric.* **13.** 171-174.

Forty-three per cent. of imported meat comes from countries where foot and mouth disease exists. The author contends that no meat should be imported from such countries unless in such a condition as to permit of inspection on landing and that home and colonial production should be fostered with a view to meeting the demand without drawing on countries not free from the disease.—NORMAN HOLE.

WALKER, J. (1931). **Rinderpest.**—*Ann. Rep. Dept. Agric. Kenya, 1930.* 108-109.

BEATON, W. G. (1931). **Infectivity of Shade-dried Hides from Rinderpest infected Cattle.**—*Vet. J.* **87.** 532-533.

The first article deals with experiments on the immunity produced in cattle after inoculation with spleen pulp vaccine. Three doses of vaccine given at seven day intervals and representing 3 g. of spleen pulp gave sufficient immunity to protect against a severe reaction from contact or inoculation with virus 12 months later. Experiments are in progress to test the immunity conferred by one dose of vaccine followed by virus inoculation from 5 to 15 days later.

The second article deals with three experiments carried out to ascertain the period of infectivity of shade-dried hides. Portions of hides from a rinderpest-infected animal were removed and emulsified in saline (1 : 4) and 10 c.c. of the fluid were inoculated subcutaneously into cattle. In the case of failure to react the immunity of the animal was tested later by the inoculation of virulent blood. Controls were used to show that the hides contained virus before drying.

The hide emulsions were virulent after 36 hours shade drying but not after 48 hours.—U. F. RICHARDSON.

MIGONE, L. E., & PENA, R. (1932). Le mal de Cadéras des bovidés du Paraguay. [**Bovine Mal de Caderas in Paraguay**].—*Bull. Soc. Path. exot.* **25.** 590-597.

It is only comparatively recently that this disease, which was first described in 1913 as enzootic paraplegia in cattle, made its appearance in Paraguay. During the last five years 50 per cent. of the stock have been affected in certain districts and the death rate which has never been less than 95 per cent. has reached at times 100 per cent. The disease is now looked upon by farmers as the most important of all those with which they have to contend. Several workers have been engaged in solving the cause of the plague and Migone and some other earlier ones, including ARANDA and OSUNA, attributed the cause to a poisonous plant known locally as "Caábó-Pochy" (*Ipomohea digitata*). Later, in 1926, it was said to be a form of haemorrhagic septicaemia, due no doubt to the fact that certain workers from Brazil and Uruguay had stated that a similar condition in their

countries was due to this cause.

In March, 1931, the authors started their researches into this disease and they proved that " mal de cadéras des bovidés " in Paraguay is caused by a virus closely allied to the rabies virus, differing in certain characters particularly in its virulence, which goes to suggest the plurality of the virus.

The clinical picture of the disease is described in detail and the authors emphasize that the two predominating factors are (1) the great range of the clinical symptoms and (2) the very high death rate. There are two forms of " mal de cadéras des bovidés " :—(a) the quiet form and (b) the furious form. In most animals the earliest symptom is incoordination in the hind quarters and this is soon followed by paralysis. These symptoms are responsible for the unfortunate name of the disease (mal de cadéras) which confuses it with trypanosomiasis. Affected animals isolate themselves from the rest of the herd ; they are easily disturbed, rumination ceases, there is frequent passage of small amounts of urine and there is constipation. The animals go down after two or three days, but they frequently sit up moving around on their haunches as on a pivot. Occasionally cases are seen with paralysis in the fore quarters.

In the furious form the animals bite themselves and will even attack other animals or human beings. In this form there is always impaired vision and the animals walk blindly into objects ; similar results were seen in one of the experimental rabbits. In the majority of cases the animals live for from three to four days after they are down, but some cases last for 12 days especially when it is possible to feed the animal. Just before death the temperature is subnormal, but in the earlier stages there is always fever (38·5° to 40·5° C.) and the muzzles are dry in spite of continuous salivation. Migone and Peña summarize the results of other workers (Carini, Haupt, Rehaag, Desousa, Carneiro, Lima, Costa and Acosta) who studied a similar plague in southern Brazil and the northern part of the Argentine, and point out that these authors agree with them in attributing the disease to the rabies virus. There are certain points still to be investigated [it is presumed that Migone and Peña are referring chiefly to the mode of transmission and protective inoculation or vaccination] and the work they have done will help to clear up these points.

Remlinger and Bailly, working with the virus sent from Paraguay by Rosenbusch, have now definitely agreed, as the result of cross immunity and serum neutralization tests, that the virus is that of rabies, although at first they called it a form of pseudo-bulbar paralysis. It is contended that the delay in deciding about the nature of the virus was due to the fact that rabies was never considered to be capable of displaying such marked variations in the clinical picture in animals and man. When the disease first occurs in an area there are at first only isolated cases but later the numbers gradually increase with intervals during which it appears to have abated. It may take as long as three, ten, or even twenty months for the plague to reach its highest level ; the disease never spreads readily from one area to another and often there is a clean district surrounded by several badly infected ones. Another fact which goes to prove that the disease is not directly contagious is that, when animals are removed from an infected area to a healthy one, deaths continue to occur in these animals up to two and a half months afterwards while the other animals in the new area remain quite healthy, though in contact ; it is further presumed from these findings that the period of incubation can be as long as two and a half months. All classes of livestock (horses, pigs, sheep and dogs) are affected and in horses the disease can easily be confused with trypanosomiasis, but the diagnosis of real " mal de cadéras " can easily be made by demonstration of the presence of trypanosomes

in the blood. The condition in the dog is very important as that animal is looked upon as the most likely transmitting agent. By careful investigation real rabies in the dog can be distinguished from the " mal de cadéras " form of the disease.

Post-mortem findings except those of the central nervous system are not significant, and where they do occur, especially in the digestive tract, they are secondary and due to paralysis. The most important pathogenic changes affect the central nervous system. The meninges are congested, especially those of the brain, and there is marked leucocytic invasion of the cerebrospinal fluid. In the pia mater the capillaries are distended and there is marked congestion of the choroid plexus. In the brain there is a perivascular infiltration of the capillaries by round cells and lymphocytes and the nerve cells show a granular degeneration with vacuolated nuclei. In sections of the hippocampus (Mann's stain) large numbers of Negri bodies can frequently be demonstrated but, as Remlinger and Bailly have pointed out, these bodies are not always present and to demonstrate them it is sometimes necessary to inoculate a series of laboratory animals.
—H. V. M. Metivier.

Havens, L. C., & Mayfield, Catherine R. (1932). **The Antigenic Properties of Rabies Virus.**—*J. Infect. Dis.* **50.** 367-376. 4 tables [9 refs.]

From flocculation and complement fixation tests with rabies virus the authors conclude that rabies behaves in a similar immunological manner to other virus diseases. They obtained specific flocculation with both fixed and street virus antigens by using hyperimmune rabbit sera. For complement-fixation work, in order to avoid the natural anticomplementary factor of rabbit serum, they hyperimmunized guinea pigs; specific fixation of the complement occurred, although the antibody content was low. These immunological characters seem opposed to the view that Negri bodies have an aetiological significance in rabies.
—Norman Hole.

Hudson, J. R. (1931). **Contagious Pustular Dermatitis of Sheep.**—*Ann. Rep. Dept. Agric. Kenya, 1930.* pp. 132-133. [5 refs.]

The author reports an outbreak of the disease in Northern Kenya. He was able to transmit it to healthy sheep and the clinical picture was identical with that described by Glover [(1930). *11th Internat. Vet. Congress*]. Hudson further demonstrated the difference between the Kenya dermatitis and sheep pox which exists in the same part of Africa.—J. E.

I. Furth, J. (1931). **Studies on the Nature of the Agent transmitting Leucosis of Fowls. I. Its Concentration in Blood Cells and Plasma and Relation to the Incubation Period.**—*J. Exp. Med.* **55.** 465-478. 4 tables. [10 refs.]

II. Furth, J., & Miller, H. K. (1931). **Studies on the Nature of the Agent transmitting Leucosis of Fowls. II. Filtration of Leucemic Plasma.**—*Ibid.* 479-493. 5 tables. [22 refs.]

III. Furth, J. (1931). **Studies on the Nature of the Agent transmitting Leucosis of Fowls. III. Resistance to Desiccation, to Glycerin, to Freezing and Thawing; Survival at Ice Box and Incubator Temperatures.**—*Ibid.* 495-504. 5 tables. [11 refs.]

I. By experimenting with a strain of fowl leucosis of unusual virulence Furth was able to perform quantitative tests with the " transmitting agent " of this disease. He produces evidence to show that the leucosis can be transmitted by plasma alone, but a slightly higher percentage of successful inoculations was

obtained with suspension of cells. With decreasing amounts of " transmitting agent " a longer incubation period follows. This effect is not so marked with variation in the amount of a cell suspension. The " transmitting agent " causes erythroleucosis and myeloid leucaemia.

II. The concentration of the agent transmitting leucosis is decreased when the plasma is passed through silicious filters. This decrease is more marked if there is present in the plasma any particulate matter or any matter having an affinity for silicious material. Removal of particles by coarse filtration or by centrifugation enables the transmitting agent to be passed readily through the finest silicious filters, but a certain dilution is made evident by an increase in the incubation period of the disease. The agent passes (with difficulty) through a 3 per cent. collodion membrane indicating that its size approaches that of bacteriophage.

III. Survival experiments with the agent transmitting fowl leucosis gave variable results due chiefly to difficulties of technique. The agent can be preserved, retaining its activity, for 54 days in dried blood and for twice that time in blood to which glycerol has been added. It survives immersion in liquid air and ice-box temperature longer than in the incubator.

A close similarity is shown between the behaviour of the agent causing leucosis of fowls and those causing avian tumours.—A. C. Fraser.

I. Levaditi, C., & Lépine, P. (1931). Sur l'action réductrice du sérum dans le peste aviaire. [**The Reducing Action of Fowl Plague Serum**].—*C. R. Soc. Biol. Paris.* **107.** 1080-1082. [2 refs.]

II. Purchase, H. S. (1931). **Experiments on the Viability of the Virus of Fowl-Plague under Trade Conditions.**—*Vet. Rec.* **11.** 644-648. 7 tables. [13 refs.]

I. Levaditi and Lépine have observed that the fresh serum of fowls affected with fowl plague has the power of reducing certain colouring agents, e.g. methylene blue, cresyl blue and janus green. If a tube containing 2 c.c. of virulent serum, coloured by the addition of a drop of a 1 : 400 solution of methylene blue and rendered anaerobic (either by a thick layer of vaseline or by creating a vacuum), is held at 37° C. a decolourization starts at the bottom of the tube and gradually extends upwards ; it is observed after some hours, and reaches its maximum in from 24 to 36 hours. If the tubes are held in the incubator the blue colour gradually returns and is completely restored in from 60 to 90 hours. The serum in the tube retains its virulence. The reduction of the methylene blue occurs slowly and feebly at room temperature and does not take place below 0° C.

II. In view of the circumstantial evidence that fowl plague is introduced into England from time to time through the medium of infected carcasses from countries in which the disease is enzootic, Purchase carried out experiments to ascertain the viability of the virus in carcasses and feathers held under trade conditions of chilling. He found that the virus survived for 287 days in muscle and for 303 days in bone marrow when stored at chilling temperature (31° F. to 38° F.). Attempts to produce the disease by feeding fresh or chilled virulent muscle gave negative results, but infection was successfully set up with blood. The virus survived for 18 days on feathers when kept in a cool place.—T. M. Doyle.

Lagrange, E. (1931). Sur l'autostérilisation mortelle des Poules vaccinées contre la peste aviaire d'Egypte. [**On the Fatal Autosterilization of Fowls Vaccinated against Egyptian Fowl Plague**].—*C. R. Soc. Biol. Paris.* **106.** 1080-1081. [3 refs.]

Lagrange, E. (1931). L'autostérilisation mortelle de la peste aviaire d'Egypte

est un phénomène épidémique. [**Fatal Autosterilization of Egyptian Fowl Plague is an Epidemic Phenomenon**].—*Ibid.* 1081-1084. [5 refs.]

According to the author, fowl plague in Egypt has a sharply marked seasonal occurrence—from December to June. The disease is widespread during this season and, even in fowls purchased for experimental purposes and kept in pairs under good hygienic conditions, the mortality varies from 50 to 100 per cent.

The first observation of autosterilization by Lagrange was made in 1928. The brain, liver, spleen, blood and filtered faeces of five naturally infected fowls which had died after showing typical symptoms of the disease were found to be avirulent. The only proof that the fowls had died of plague lay in the fact that the brain tissue of these fowls immunized healthy fowls. About the same period it was found that a fowl which had recovered from natural infection with plague had not acquired any immunity against the disease.

In other instances in which tissues were tested from fowls which had died on known infected premises after suffering from typical symptoms and developing typical lesions, brain tissue was avirulent, but spleen and liver tissue from some of the fowls was infective ; susceptible fowls infected with these tissues, however, only contracted the disease after an incubation period of from 12 to 15 days.

Out of a large number of brains examined the author encountered three which, although they contained antigen when fresh or after storage for a few days in the cold chamber, became virulent after storage for two months at a low temperature in glycerol. The phenomenon of autosterilization did not appear to have any connection with a particular strain of virus, but the author considers that it may be related to the season of the year. As the virus which underwent autosterilization was virulent when present in the spleen and possessed immunizing properties when present in the brain, it is evident that the infection was as usual of a septicaemic character and that it was only after death that the virus was destroyed or attenuated in certain organs. Lagrange also observed that, when vaccinated fowls were tested for immunity, a varying percentage died and that in these particular fowls while the brains were always virulent the blood and other organs were avirulent.

In general he found that in susceptible fowls autosterilization occurred principally in the brain, whereas in vaccinated fowls the brain was the only organ which was virulent.—T. M. Doyle.

DISEASES CAUSED BY METAZOAN PARASITES.

Sen, S. K. (1932). **The Control of Blood-Sucking Insects in India.**—*Ind. J. Vet. Sci. & Anim. Husb.* **2.** 29-40. [39 refs.]

The author briefly discusses control by means of repellents, attractants, traps and biological methods.

Fish oil has been a main constituent of mixtures found in the United States to repel flies for from two to three days when applied to the bodies of animals. Graybill found that, unless the mixture is applied lightly, toxic effects develop. A mixture consisting of 5 oz. assafoetida, 13 oz. vinegar and 20 oz. water has been said to repel tabanids for a week. A mixture consisting of common soap 1 lb., water 4 U.S. gallons, petroleum 1 U.S. gallon and powdered naphthelene 4 oz. applied once or twice with a brush has been recommended for use on dairy cows. It has been stated that, after internal administration of potassium tellurate, animals repel mosquitoes, flies and ticks, although on trial this was not found to

be the case. It is generally considered that the use of repellents is the least effective method of controlling biting insects.

Attractants offer greater hope of effecting control as the insects can then be collected and destroyed. Biting flies respond to thermal rather than to olfactory stimuli. Measures based on these principles are described.

Traps are discussed under headings devoted to the type of insect studied. Simple wooden boxes with a dark cloth lining have been used for mosquitoes. BATH (1931) has used a mechanical trap which mosquitoes enter, but are unable to leave. The use of selected collections of stagnant water on which the females oviposit yields success, as the larvae can then subsequently be destroyed.

Trapping has seldom been used for tabanidae. Tanglefoot has been used ; oiling the surface of water used by the flies has been advocated—the flies skim the surface to take up water with the proboscis and get soiled with oil. HEWITT (1920) advocated the use of a special trap. Dummy animals have been used as traps with success.

The trap described by HARRIS (1931) for tsetse flies is described and also various methods of trapping house flies and blowflies. A small section is devoted to biological control.—W. A. P.

I. TILLYARD, R. J. (1931). **The Buffalo-Fly in Australia.**—*J. Sci. & Indust. Res. Australia.* **4.** 234-243. 2 figs. on 3 plates, 3 maps. [34 refs.]

II. ROBERTS, F. H. S. (1931). **The Buffalo Fly** (*Lyperosia exigua* **de Meijere).**—*Queensland Agric. J.* **35.** 163-166. 2 figs.

III. HENRY, M., & GURNEY, W. B. (1932). **The Buffalo Fly.** (*Lyperosia exigua* **de Meijere.**)—*Agric. Gaz. New South Wales.* **43.** 329-335. 2 figs.

IV. —. (1932). **The Buffalo Fly Problem—Liberation of the Parasitic Wasp Spalangia sp. Co-operation of the Veterinary Services of the Netherlands East Indies.**—*J. Sci. & Indust. Res. Australia.* **5.** 135-136.

V. —. (1932). **Buffalo-Fly Problem—Report by Professor E. Handschin.**—*Ibid.* 191-192.

I. This paper, which is written for the general public, gives a short account of the buffalo fly (*Lyperosia exigua* de Meijere) in Australia, with special reference to the work done by the Australian Council for Scientific and Industrial Research.

There is no doubt that the fly whose original home was the Indo-Malayan region originally entered Australia as early as 1825 by way of Melville Island (North Australia) at the time when the first buffaloes were introduced there. Buffaloes were first brought to the mainland in 1838 ; the fly came with them and it has since spread along with the development of the pastoral industry in Northern Australia. GILRUTH, when Administrator of the Northern Territory, in 1912, first placed on record the importance of the fly in Australia.

In Northern Australia the fly attacks buffaloes, cattle of all kinds, horses, mules and donkeys and, occasionally, man. Under natural conditions it does not attack dogs, pigs, goats, sheep, rabbits or the native marsupials. It prefers bulls to bullocks or cows and prefers some individual bullocks to others, but the explanation of this selective taste is not known, although it is frequently associated with the age and condition of the host.

The importance of the fly in relation to livestock lies in the " fly-worry " it causes ; it interferes with grazing, and from rubbing against trees etc., the pestered animals make sores which often become septic with resultant loss of condition. Cattle acquire some tolerance to attack and about 1,000 flies per beast is somewhere about the critical point beyond which damage is caused. Concentrations of 2,000 to 5,000 flies per beast are observed.

The odour of the host, the warmth of its body and water vapour from sweat play an important part in attracting the flies. The intensity of the light, wind direction, roughness of the surfaces on which they rest and especially temperature and humidity are important factors. The flies remain on the host for long periods (ten days or more) and feed intermittently. They pair on the host and when dung is dropped, the females quickly lay their eggs in it and return to the host within a few seconds. Of the dung of cattle, buffaloes and horses, that of the buffalo is the most and that of the horse the least attractive. Dung of carnivorous animals or dung of any type that dries out rapidly is not attractive.

The spread of the fly in Northern Australia from 1825 to date is shown in the plates and discussed in detail in the text. The probable limits of spread are considered to be governed by the incidence of more than 20 inches of annual rainfall or heavy frosts. The requisite conditions are, therefore, unfortunately present in the best beef-raising and some of the best dairying country in the whole of Australia.

The Division of Economic Entomology, Council for Scientific and Industrial Research, has devoted considerable attention to the fly since 1928.

It is not a pest of any importance in most parts of the Dutch East Indies, although it exists there. In view of this difference in the trouble caused by the fly in the two regions, investigations were carried out in the Dutch East Indies parallel with the work in Australia. Neither rainfall nor the breeds of cattle involved were responsible for this discrepancy and further work is in progress. It is considered that biological control by means of natural enemies offers the only possible hope of dealing with areas that are already infested and certain parasites are being studied.

II. A general account written for farmers.

III. A general account written for farmers. Western Australia is in a fortunate position in that, owing to climatic and topographical conditions, the fly can only spread to Western Australia along the coastal belt or by cattle transported in ships. The government has, therefore, provided facilities for spraying cattle immediately before they are placed in the ships at northern ports and, although it has not been quite 100 per cent. effective, this line of action has yielded good results. The importance of dealing with infested manure from the boats is mentioned and the extent of spread along rail routes is discussed.

IV. An announcement that the liberations of this wasp are about to take place and that Professor HANDSCHIN of the University of Basle who has been working at Buitenzorg, Dutch East Indies, will himself deal with this aspect of the question in Australia.

V. Professor HANDSCHIN has finished his two years work, has written a report which will be published shortly and has left Australia. He has found that, of all the different parasites of *Lyperosia exigua* discovered, species of *Spalangia* are the only ones likely to be of practical value. The Javanese species studied live about 27 days, lays from 160 to 170 eggs, each egg in a separate puparium, and the life cycle occupies from 18 to 21 days. North Australian species live only about 15 days and lays only about 85 eggs. Parasitism of from 8 to 46 per cent. of puparia of the fly was observed in different parts of the Dutch East Indies against from 1 to 7 per cent. in Australia. Hybridization of Javanese and Australian *Spalangia* has been carried out in attempts to produce a more effective race and these hybrids have been liberated.

Further work on the bionomics of the fly has indicated that it is a tropical animal and unlikely to establish itself much further south than Rockhampton, Queensland. It may occasionally arrive as far south as Brisbane, or even further,

but owing to the rather lengthy periods when the average temperature goes below 72° F., it will die out.—W. A. P.

Stålfors, H. (1931). Kungl. förordning angående nötbromsens bekämpande. [**Royal Decree regarding Eradication of the Ox Warble Fly**].—*Svensk Vet.-tidskr.* **36.** 140-149.

A royal decree regarding the eradication of the ox warble fly in Sweden was promulgated on the 1st July, 1931. The recommendation of the decree may be adopted at will by an Agricultural Society's whole district or by part of it. Early in the spring, before the cattle are put out to graze, the owners are obliged to free their cattle from the larvae in the subcutaneous tissues of the back either by treatment with a suitable ointment or, if this does not suffice, by squeezing the larvae out.

Special inspectors, appointed by the agricultural societies, ascertain that the cattle are free from living ox warble larvae before they are allowed out to graze in the spring.—N. Lagerlöf (Stockholm).

Hobson, R. P. (1931). **On an Enzyme from Blow-Fly Larvae** (*Lucilia sericata*) **which digests Collagen in Alkaline Solution.**—*Biochem. J.* **25.** 1458-1463. 1 fig., 2 tables. [7 refs.]

The author recalls the fact that *Lucilia* larvae normally develop in meat and carrion, but are also a serious pest to living sheep, feeding first in the wool and later penetrating into the tissues. Under suitable conditions they can consume meat entirely, leaving no trace of connective tissue and, since they cannot ingest solid particles of meat, the digestion of connective tissue must occur outside the body. In a previous communication [(1931). *J. Exp. Biol.* **8.** 109.] he pointed out that the larvae secrete a protease which acts in alkaline solution and persists in their excreta; in the present investigation he has been able to show that the excreta of *Lucilia* larvae contain proteolytic enzymes which digest collagen and elastin but not keratin. The enzyme which digests collagen is produced by the cells of the mid-gut and not by intestinal bacteria, since it occurs in sterile larvae. The excreta digests collagen in alkaline solution, the optimum reaction being at about pH 8·5, but with increasing acidity the activity of the enzyme decreases and it almost disappears at pH 4·0.—Ll. E. W. Bevan.

Freney, M. R. (1932). **The Chemical Treatment of Baits for attracting Blowflies. I.**—*J. Sci. & Indust. Res. Australia.* **5.** 94-97. 2 tables. 1 graph.

In an earlier paper it was shown that a mixture attractive to primary blowflies (*Lucilia cuprina*, *L. sericata*, *Calliphora stygia* and *C. augur*) could be obtained by hydrolysing keratin by means of sodium sulphide. In the experiments under review, the work was extended to include other substances rich in protein. Among these were fresh sheep's liver and " blowfly soup "—prepared by allowing trapped blowflies to putrefy in water in a meteor trap for five days—two of the baits most commonly used by pastoralists in blowfly traps. These baits were treated with sodium sulphide which prolonged their period of attractiveness and, in addition, rendered them more attractive than the untreated baits to all species of blowflies. It was noted that this attractiveness due to treatment was greater for the so-called secondary flies (*Chrysomia rufifacies*, *Microcalliphora varipes* and *Sarcophaga* spp.) than for the primary blowflies previously mentioned. The total effectiveness of the treated bait was 19 times that of the untreated bait. The correct amount of sodium sulphide to be used under different conditions has yet to be determined. —Ll. E. W. Bevan.

WARDLE, R. A. (1932). **On the Technique of Cestode Study.**—*Parasitology*. **24.** 241-252. 2 figs. [13 refs.]

This paper deals with the collection, fixation, staining and reconstruction from microtone sections of cestodes. In each instance a description is given of the various methods of previous writers and a full account of Wardle's own technique. —E. L. TAYLOR.

BOURNE, R. F. (1932). **Biological Relationships in the Control of Canine Taeniasis.**—*Vet. Med.* **27.** 58-60.

A few notes of an elementary nature are given on seven of the commoner cestodes of the dog. It is considered that because of the possible danger to human health (infestation with *Echinococcus granulosus*) the determination of the species of tapeworm should be a routine practice in the treatment of taeniasis in dogs. Immersion in a mixture of phenol crystals and choral hydrate, one part of each and two parts acetone, is recommended as a quick method of clearing specimens for microscopical examination.—E. L. TAYLOR.

CHRISTENSON, R. O. (1931). **An Analysis of Reputed Pathogenicity of Thysanosoma actinioides in Adult Sheep.**—*J. Agric. Res.* **42.** 245-249. 2 figs. [11 refs.]

From time to time a considerable amount of damage has been attributed to infestation with *Thysanosoma actinioides* in the liver of sheep. The reported symptoms are, however, very variable and it is therefore probable that some, at least, are due to causes other than the presence of this parasite. In the course of a series of observations on sheep in an infected district it was not found possible to trace any disease to the presence of this worm. The period of highest death rate coincided with the period in which the worms were least prevalent.

Figures are given to show that the incidence of the parasite could not be correlated with signs of ill health and it is concluded that undue pathogenic importance has been ascribed to this worm.—E. L. TAYLOR.

MONTGOMERIE, R. F. (1931). **On the Longevity of *Fasciola hepatica* in Experimentally Infected Rabbits.**—*J. Helminthol.* **9.** 209-212. [1 ref.]

Observations of other authors on the longevity of *Fasciola hepatica* in the livers of sheep have shown that some are able to live there for from three to five years although the majority live only from nine months to one year. They do not appear to be able to live so long in cattle. This paper reports a few observations on three experimentally infected rabbits which were subsequently guarded against any apparent possibility of further infestation; one of them died 13 months later when four flukes were recovered; one was killed two years and seven months later when seven flukes were recovered and one died three years and one month later when eleven flukes were recovered. Periodic counts of the eggs passed in the faeces did not suggest any gradual diminution of infestation, but after a preliminary rise it fell to a constant level, from which it is calculated that each fluke produced 1,181,000 eggs.—E. L. TAYLOR.

HENRY, A. (1931). L'infestation ascaridienne prénatale chez les Carnivores. [**Prenatal Infestation with the Ascarids of Carnivores**].—*Bull. Acad. vét. France*. **4.** 162-166. [7 refs.]

The author gives a short account of some of the observations which have been made and experiments which have been carried out to show how easy it is for pups to become infected with ascarids *in utero*. He points out that on two

occasions the larvae of *Belascaris* have been found in the lungs and the tracheas of fox cubs which were still-born and he considers that this prenatal parasitism is by no means a negligible cause of death.

In the course of the discussion which followed, MALLET said that he had found mature ascarids in the intestine of pups from 15 to 25 days after they had been removed from the bitch by caesarean section. They had been reared on sterilized milk and so must have become infected *in utero*. COCU said that he had recently come across a three weeks old pup which had been separated from the bitch at birth and reared on boiled milk ; it had expelled an ascarid several centimetres in length and there could be no doubt that this infection had occurred before birth. ROUSSEL thought this question of prenatal infection very important as the loss in rearing young dogs was considerable.

In reply Henry said that valuable results were now being obtained by breeders of silver foxes from the systematic dosing of the cubs with capsules of tetrachlorethylene. This dosing is commenced when the cubs are three weeks old, a second dose being given two weeks later and subsequently repeated at monthly intervals. The danger from ascarids has passed at an age of three months, but the treatment may be continued longer for the control of *Uncinaria*. By preventing the accumulation of infective material on the ground this system eventually leads to the prevention of prenatal infection.—E. L. TAYLOR.

ROSS, I. Clunies. (1931). **The Large Stomach Worm of Sheep. Control by Means of Carbon Tetrachloride.**—*J. Sci. & Indust. Res. Australia.* **4.** 217-220.

Three methods of treatment were tried in these experiments :—(1) monthly dosing with 2 c.c. of carbon tetrachloride in 3 c.c. of liquid paraffin together with access to a medicated mineral mixture ; (2) access to a medicated mineral mixture alone and (3) an emulsion of tetrachlorethylene in the drinking water. These were each tested on three flocks of 50 sheep grazing on three pastures of 80 acres.

At the beginning of the experiment the sheep carried a moderate infestation of *Haemonchus contortus* (some hundreds) and light infestations of *Trichostrongylus* spp. and *Oesophagostomum columbianum*. Faecal examinations were carried out from five sheep in each flock at monthly intervals, cultures being made and species of the larvae determined.

Dry weather enforced the termination of the experiment at the end of four months and a *post-mortem* examination was carried out on five sheep from each group. In the five from the flock which had received carbon tetrachloride and the medicated mineral mixture only two *H. contortus* were found ; the five from the flock receiving the medicated mineral mixture alone showed an average of 121 *H. contortus* per sheep, the five from the flock treated with tetrachlorethylene in the drinking water showed an average of 116 worms per sheep and the control flock an average of 253 worms per sheep. All showed a light infestation with *Trichostrongylus* spp. [*O. columbianum* is not mentioned].

It is concluded that monthly treatment with carbon tetrachloride is an effective way of dealing with *H. contortus* infection and might even lead to its eradication. The results shown in the other groups are regarded as insignificant and no conclusion can be drawn as to the efficacy of the treatments concerned.—E. L. TAYLOR.

FOSTER, A. O., & CORT, W. W. (1931). **The Effect of Diet on Hookworm Infestation in Dogs.**—*Science.* **73.** 681-683.

Five dogs from 9 to 16 months old which carried a few hookworms (*Ancylostoma caninum*) but were proved to have a very strong resistance to fresh infection,

were placed on a special diet deficient in vitamins and important minerals. Egg counts which were made on the faeces showed that the egg output of the worms present was greatly increased as a result of the deficient diet. A dose of 500 infective larvae was given to each dog and after the normal prepatent period the egg count was observed to rise to a high peak, showing that a rather heavy infestation had been acquired. On returning to the normal adequate diet the worms were quickly lost, the egg count dropped and the dogs speedily regained their good condition.

A second experiment was carried out on two ten-year-old dogs which were not carrying worms and had been proved to have a strong resistance to infection. These were placed on the deficient diet and at fortnightly intervals were given doses of 500 infective larvae. Eggs appeared in the faeces, the count rapidly increasing and 90 days after they were placed on the deficient diet the number given off per day reached 700,000 in the one dog and 900,000 in the other. The dogs were then returned to the adequate diet and, although the fortnightly doses of larvae were still continued, the egg counts steadily fell to a low level and numbers of worms were lost, showing that there is a definite correlation between dietary deficiency in dogs and susceptibility to infection with *A. caninum*.—E. L. Taylor.

Daubney, R., & Hudson, J. R. (1932). *Oesophagostomum multifoliatum* **n.sp. an Undescribed Nematode from Sheep and Goats.**—*Parasitology*. **24.** 265-267. 5 figs. [2 refs.]

A description is here given of a hitherto undescribed species of oesophagostome found in the large intestine of sheep and goats in Kenya Colony. It may be differentiated from other members of the genus *Oesophagostomum* by the presence of a well developed cephalic vesicle, and of an external leaf crown consisting of 30 elements, also by the large size of the eggs which measure from 0·15 to 0·165 mm. long by from 0·068 to 0·088 mm. broad.—E. L. Taylor.

I. Marotel. (1931). L'anémie vermineuse. [**Verminous Anaemia**].—*Rev. vét. et J. Méd. vét.* **83.** 657-664.

II. Alt, H. L., & Tischer, O. A. (1931). **Observations on the Metabolism of the Tapeworm** *Moniezia expansa*.—*Proc. Soc. Exp. Biol. New York.* **29.** 222-224. 1 table. [5 refs.]

I. Cylicostomes are the principal cause of verminous anaemia in horses and in the author's opinion are infinitely more dangerous than the strongyles. In giving an account of the life history, Marotel mentions a rhabditiform larva which appears after the faeces have been lying for eight days in moist surroundings ; this is said to be the infective stage and to pass through three metamorphoses in the mucous membrane of the large intestine of the horse.

In the first metamorphosis the oesophagus loses its three teeth and becomes unarmed. [This presumably refers to the change from rhabditiform to filariform oesophagus which occurs in the free-living stage before the larva becomes infective].

Diagnosis is difficult as the number of eggs in the faeces gives no sure indication of the number of worms, many of which may still be in the larval stages.

Carbon tetrachloride, oil of chenopodium, turpentine, thymol, arsenic and copper sulphate are recommended as useful in treatment, and careful management of the pastures for the protection of young stock is strongly advised.

II. The authors propose to study the protein metabolism of the cestodes of human beings with a view to clarifying the aetiology of the anaemia which these worms produce. In this paper they give a brief account of a preliminary investigation into the respiration of *Moniezia expansa* in phosphate Ringer solution under aerobic and anaerobic conditions.—E. L. Taylor.

DISEASES, GENERAL.

NEUMÜLLER. (1931). Die hauptsächlichsten Krankheiten unserer Pferde und Rinder und ihre Verhütung. [**The Chief Diseases of our Horses and Cattle and their Prevention**].—*Vierteljahrhefte f. genoss. Tierversich.* **3.** 49-96. [Numerous refs.]

Although this article was written primarily for the instruction of stock owners in Germany and concerns that country only, most of it applies equally elsewhere.

First the past organization and achievements of the veterinary profession are reviewed and a description is given of the means available for the control of animal diseases.

There are in Germany two laws—the German Stock Disease Law of 1909 and the Reich Law of 1900. The former has for its object the prevention of the entry of diseases from abroad and the control of diseases already present. A list is given of those diseases which are notifiable—anthrax, bovine tuberculosis (clinically eivdent), glanders, swine erysipelas, haemorrhagic septicaemia, swine plague, fowl cholera, blackleg, foot and mouth disease, contagious bovine pleuropneumonia, sheep pox, swine fever, rabies, fowl plague, contagious vagnitis, dourine and equine and ovine mange. The Chancellor of the Reich has power to make additions to the list. Strangles and equine infectious anaemia are also notifiable in certain districts. The Reich Law of 1900 referring to the slaughter of animals and meat inspection regulates the food supply of the people.

Certain veterinary organizations such as colleges, veterinary divisions of provincial departments of agriculture etc., and their work for the livestock industry are described and it is stated that the German farmers are rapidly realizing the good that can result from co-operation with their veterinary advisors. Quackery is a great danger owing to lack of enlightened legislation.

The larger part of the article is taken up by a description of the more economically important and commoner diseases of horses and cattle, including sections on diseases of breeding and of new-born animals. As such it forms a good outline useful for reference purposes both by veterinarians and stock owners.—J. E.

TASSI, L. (1932). La causa del corpo luteo persistente delle bovine sterile e un'iperemia patologica dell 'apparato genitale. [**The Cause of Persistence of the Corpus Luteum in Bovine Sterility is a Pathological Hyperaemia of the Genital Apparatus**].—*Clin. Vet. Milano.* **55.** 24-39. 6 figs. on 2 plates. [21 refs.]

The author gives some evidence to show that persistence of the corpus luteum is the result of general hyperaemia of the genital organs. He states that in the majority of cases this hyperaemia is of inflammatory origin and is due to the presence of some form of metritis. It is admitted, however, that in some cases no inflammatory condition of the organ can be found and that the persistence of the corpus luteum is not associated with any disease of the organ. He does not wish to imply that all inflammatory conditions of the uterus are accompanied by persistent corpus luteum. Persistence has been produced by setting up an artificial hyperaemia by scarification of the mucous membrane of a uterus which has just expelled its foetuses.

Follicular extract was found to cause prolongation of the hyperaemia of the ovary normally associated with ovulation and persistence of the corpus luteum.

—A. LESLIE SHEATHER.

RICHTER. (1931). Aufzuchtkrankheiten bei Edelpelztieren. [**Diseases Incidental**

to Breeding in Fur Animals].—*Deuts. tierärztl. Wschr.* **39.** 756.

SPREHN, C. (1931). Die parasitären Aufzuchtkrankheiten bei Pelztieren und ihre Bekämpfung. [**The Control of Parasitic Diseases Incidental to Breeding in Fur Animals**].—*Ibid.* 756-758.

These papers were presented at the sixth meeting of Workers on Diseases of Breeding Animals held at Leipzig in October, 1931.

Richter gives a brief statistical review of the silver fox industry in Germany. There are now about 800 farms in the country. Fertility is about 75 per cent. of all matings and during the years 1926 to 1929 about 2,000 young were born, of which some 23 per cent. died before maturity, the large majority when newborn.

Sprehn, whose experience of fur animals included during the years 1927 to 1929 professional care of 675 silver foxes, 448 minks, 90 nutria and 30 racoons, gives a description of the commonest diseases.

Infestation with *Toxocara canis* is the commonest cause of illness of young foxes ; other nematodes found in these animals are *Uncinaria stenocephala*, *Crenosoma vulpis* and *Eucoleus aerophilus* : coccidia (*Isospora canivecolis*) cause some disease. Salmonella infection occurs sporadically.

Minks are sometimes infested by the trematodes *Euryhelmis squamula* and *Troglotrema acutum*. Other parasites encountered are *Capillaria entomelas* and coccidia. Salmonella infection has been reported in minks.

Nematode infestation occurs in racoons and distemper is a cause of loss.

Coccidiosis and infestation with *Strongyloides* and *Trichostrongylus* spp. have been observed in beavers.

The author discusses the treatment of all these conditions ; hygienic measures play a large part in control.

In discussion on the paper, Sprehn pointed out the dangers of using market meat or meat from knackeries, as bacterial infection has been introduced to fur animal farms by such practice. SCHEUNERT advised that meat should be cooked, VON OSTERTAG suggested the use of the flesh of old cows instead of horseflesh. Sprehn stated that the ear mite, *Otodectes cynotis*, is common in captive silver foxes. Sarcoptic mange caused by *Acarus siro* also occurs and mange (*Notoedres cati*) had broken out on one farm.—J. E.

RICHTER. (1931). Die Sterilität des Bullen. [**Sterility in the Bull**].—*Deuts. tierärztl. Wschr.* **39.** 737.

This is a short note covering 14 cases of sterility in bulls : the conditions encountered were congenital malformation of the penis in two cases, testicular atrophy in four cases, testicular tuberculosis in three cases, pseudo-tuberculosis in one case and *Br. abortus* infection in four cases.—J. E.

RODERICK, L. M. (1931). **A Problem in the Coagulation of the Blood. "Sweet Clover Disease of Cattle."**—*Amer. J. Physiol* **96.** 413-425. 1 fig. [23 refs.]

Sweet clover disease [see this *Bulletin*. **2.** 385.] occurs when the crop is mouldy or has been damaged and it can be reproduced with regularity by feeding clover from the farms on which it has occurred ; it is characterized by a progressive prolongation of the time taken for the blood to coagulate. The work under review is concerned entirely with the changes which occur in the blood in the course of the disease and descriptions are given of extensive feeding experiments, coupled with analyses and examinations of samples of blood from the experimental animals. It was found that there was a slight depression in the fibrinogen content, but this was within the probable error of a series of determinations upon blood from

normal animals. Calcium is not involved and the blood platelets remain normal, but there is a reduction in prothrombin and this reduction is parallel with the delay in coagulation. Recoveries were obtained when affected animals were injected with fresh, defibrinated, normal, bovine blood.—R. S. Roberts.

Gauss, H., & Davis, C. L. (1932). **The Incidence of Gall-Stones in Cattle.**—*J. Amer. Vet. Med. Ass.* **81.** 71-75. 1 fig., 3 tables. [2 refs.]

The authors examined 2,067 cattle intended for food, in order to fill a gap in the knowledge of the incidence of gall-stones in animals. Gall-stones were found in 21 animals, the majority of which were old cows. The results of the work are well illustrated by the tables. The stones varied widely in form and size and no single type predominated. In 17 cases the stones were in the gall bladder and in four cases in the bile duct.—J. E.

I. Bennetts, H. M. (1932). **Infectious Entero-toxæmia, "Pulpy Kidney," and other Related Diseases of Sheep.**—*Vet. J.* **88.** 248-256. [24 refs.]

II. Oxer, D. T. (1932). **"Pulpy Kidney," or Acute Infectious Entero-toxaemia of Lambs due to** *B. ovitoxicus* **(Bennetts).**—*J. Sci. & Indust. Res. Australia.* **5.** 25-27. [4 refs.]

III. Gill, D. A. (1932). **Pulpy Kidney Disease of Lambs.**—*New Zealand J. Agric.* **44.** 270-272.

I. The aim of the article is to give an abbreviated description of a disease of sheep in Australia which the author has named "infectious entero-toxaemia" and to point out the relation between this disease and other conditions of sheep, notably "struck," an enteritis and peritonitis of sheep described by McEwen and Roberts, lamb dysentery as described by Gaiger and Dalling and by Pool, and "pulpy kidney" disease described in England and New Zealand.

Infectious entero-toxaemia is an acute toxaemia of sheep caused by the absorption from the alimentary tract of a toxin derived from the multiplication in the intestinal contents of an organism closely related to, but immunologically distinct from, *Clostridium welchii*. It is similar to the disease "struck" except that in the Australian disease accumulation of fluid of the peritoneal cavity has never been observed. Lamb dysentery is distinct in that there is definite necrosis of the intestinal mucous membrane and invasion of the bowel wall by the bacteria. The causal organisms of entero-toxaemia, "struck" and lamb dysentery, and *Cl. welchii* are all immunologically distinct.

From a study of the literature upon "pulpy kidney" disease, the author advances the opinion that it is closely related to, or possibly merely a phase of, entero-toxaemia.

[In dealing with the literature on the disease "struck" the author states that only three fresh cases of the disease had been described. The original article describes 17 fresh cases, but confusion has arisen owing to the fact that toxin was demonstrated in the alimentary tract in three cases only].

II. A brief preliminary survey of researches into "pulpy kidney" disease in Tasmania in which the general results of experimental work are disclosed, but no details of the experiments are given. Five cases have been examined and in each the contents of the small intestine were found to be highly toxic. The toxic action was neutralized by *Cl. ovitoxicum* Bennetts serum, but not by *Cl. welchii* or *Cl. oedematiens* sera. *Cl. ovitoxicum* was isolated from these cases.

It is concluded that "pulpy kidney" disease is due to the elaboration of *Cl. ovitoxicum* toxin in the contents of the small intestine, and that the degenerative changes in the kidney occur after death.

III. Reference is made to the results of investigations carried out by the author in 1930, when the presence of a heat-labile, filtrable toxic substance was demonstrated in the intestinal contents of lambs which had died from " pulpy kidney " disease. In the course of investigations during the 1931 season, it was found that the antisera of *Cl. septique*, *Cl. welchii* and the lamb dysentery bacillus failed to neutralize the toxic action, but that it was readily neutralized by *Cl. ovitoxicum* Bennetts antiserum. Cultures made from the intestinal contents yielded an organism of the *Cl. welchii* type and its toxin was similar to that found in natural cases. Work was suspended to wait for the arrival of standardized toxins and antitoxins from England, but in the meantime the results obtained were amply confirmed in a publication by Oxer [see II above].

It is pointed out that the results obtained with antisera were irregular in that *Cl. ovitoxicum* toxin was not neutralized by lamb dysentery serum.

The author retains his former view that the disease is intimately connected with nutrition. [The article is in a simplified form for general reading]. —R. S. Roberts.

Cocu, J., Truche, C., & Bauche, J. (1931). Un cas de pseudo-tuberculose chez le chat. [**A Case of Pseudo-tuberculosis in the Cat**].—*Bull. Acad. vét. France*. **4.** 244-250. 1 fig. [4 refs.]

Following on a short historical review the author describes the clinical symptoms shown by a six-year-old cat, including certain remedial measures which were adopted to relieve constipation. He then gives a description of the *post-mortem* examination when lesions were found in the liver consisting of yellowish-white nodules somewhat irregularly situated, sometimes isolated and sometimes almost confluent. Much hepatic hypertrophy was observed, due partly to interstitial infiltration and partly to numerous pseudo-tubercles. A short description of the histo-pathology of the liver and a bacteriological study of the organ is given, followed by a discussion.—G. W. Dunkin.

Theiler, A. (1932). Untersuchungen über den Bau normaler und durch calcium- und phosphorarme Nahrung veränderter Rinderknochen. [**Investigations into the Structure of Cattle Bones, Normal and Altered by feeding upon Rations Low in Calcium and Phosphorus**].—*Denkschr. Schweiz. Naturforsch. Ges.* **68.** 1-154. 72 photomicrographs, 4 röntgen figs. [30 refs.]

This monographic publication records histological studies of the bones of representative animals from the experiments on " Minimum Mineral Requirements of Cattle," [Theiler, A., Green, H. H., & du Toit, P. J. See this *Bulletin*. **2.** 173]. The author has already published preliminary communications [see this *Bulletin*. **1.** 313 and **2.** 101.] indicating the more important results now discussed in detail and substantiated by numerous photomicrographs of bone sections.

Part I (pp. 1-35) deals with the structure and growth of bones of normal cattle, Part II (pp. 37-152) with similar bones of cattle in which osteoporosis, osteomalacia and rickets were produced experimentally by feeding rations deficient in phosphorus and, in certain cases, low in calcium.

The microscopic findings are described in full detail in sub-sections with a summary at the end of each, and pp. 142-150 provide a general survey of the whole work, including the author's views on the aetiology of bovine osteoporosis, osteomalacia and rickets.

Those interested in the bone pathology of these diseases will need the accompanying photomicrographs as a guide to interpretation, but for the general

reader it may be stated that the terms rickets and osteomalacia are used as in descriptive human pathology, that the author considers absolute deficiency of phosphorus as the main cause of the naturally occurring equivalent bovine diseases [see this *Bulletin*. **1.** 391.] that he does not follow the majority of the continental authors who regard ratios of minerals as intrinsically important [compare MAREK, this *Bulletin*. **1.** 261 and **3.** 59.] and considers that vitamin factors [important in human rickets] do not enter into practical consideration. —H. H. GREEN.

CARLSTRÖM, B., & SVANBERG, O. (1931). Om spasmofili (danssjuka) och rachitis hos smågrisar. [**On Spasmophilia (Chorea) and Rickets in Young Pigs**].—*Svensk Vet.-tidskr.* **36.** 351-355.

The authors have studied a disease often found in very young pigs after weaning, known under the different names of spasmophilia, chorea, etc. Quickly growing and well-developed animals seem to be most commonly affected. Without any warning except perhaps loss of appetite for a few days, the animals have peculiar attacks of spasm, especially when they start to feed. These attacks take different forms. There is usually a characteristic tetany, while at other times the attacks take the form of epileptiform convulsions, often affecting the muscles of the jaws and passing into a general tonic-clonic spasm which is frequently fatal. Sometimes a staggering, somewhat stiff gait is the only symptom.

Foods commonly used for swine are poor in minerals, maize and skimmed milk being examples.

Lack of calcium in the food may cause either slow growth with rickety changes or hypocalcaemia accompanied by the acute symptoms mentioned above. The authors have succeeded in producing this type of the disease with foods deficient in calcium. Blood taken from such animals showed a greatly reduced calcium content, the percentage of calcium in the blood serum, determined as calcium oxide, being less than 8 mg. per cent. After treatment with soluble calcium preparations, the symptoms disappeared in a few minutes. The disease can be prevented by the addition of calcium carbonate to the food.—N. LAGERLÖF (STOCKHOLM).

ADSERSEN, V. (1931). Anämie der Saugferkel und ihre Bedeutung für das Ferkelsterben. [**Anaemia of Suckling Pigs and its Significance in Relation to Mortality**].—*Deuts. tierärztl. Wschr.* **39.** 741-745. 7 figs., 2 tables. [5 refs.]

This paper was presented at the sixth meeting of Workers on Diseases of Breeding Animals held at Leipzig in October.

The author describes his researches into the anaemia occurring in suckling pigs between the third and fifth weeks of life. During the course of the disease the haemoglobin content of the blood frequently falls to one third of the normal value. Animals which survive the fifth week recover under normal conditions.

A daily dose of about 4 c.c. of 2·5 per cent. ferrous sulphate per animal yielded good results both for prophylactic and for curative treatment. The experiments performed are described and illustrated by graphs.

In discussion on the paper MIESSNER reported that anaemia in piglets is common in Prussia, but that in his opinion the exact cause is unknown.—J. E.

ASTON, B. C. (1931). **Recent Work on Iron-Starvation in Other Countries.**—*New Zealand J. Agric.* **43.** 270-272.

MALCOLM, J. (1931). **Some Present-day Views on the Metabolism of Iron,**

with Remarks on " Bush Sickness."—*New Zealand J. Sci. & Tech.* **13.** 181-188. [7 refs.]

I. This paper reviews the occurrence of bovine disease due to specific deficiency of iron in pastures and links earlier New Zealand work with more recent data from Kenya [see ORR & HOLM (1931). this *Bulletin.* **1.** 314.] and from Florida [BECKER, NEAL & SHEALY (1931). *Florida Agric. Expt. Sta. Bull.* No. 231].

The author groups together the " bush-sickness " of New Zealand, the " nakuruitis " of Kenya, the " salt-sickness " of Florida and the " pining " of the Cheviot Hills in Britain, pointing out that although the most characteristic iron deficiencies occur on volcanic soils of the Rotorua and Nakuru type there is reason to believe that aferrosis can occur on many abnormally coarse or sandy soils.

The disease is characterized by anaemia and cachexia [compare this *Bulletin.* **1.** 314.] and the treatment consists in supplying a salt lick containing any suitable iron compound (e.g. carbonate or hydrated oxide) at a cost of a few pence per annum. In Florida a trace of copper sulphate is also added.

II. This paper is of interest as a challenge to the explanation of the disease now fairly generally accepted as the basis of Aston's work.

The author discusses the physiology of iron and the disorders of disturbed iron metabolism in the human subject, then expressing the view that the case for bovine " bush-sickness " as an iron deficiency disease is by no means proven.

In view of the fact that there are no records of microscopic blood or marrow investigations, of blood counts or haemoglobin determinations, that horses on the same grazing do not develop the disease, that the body is so conservative in its iron metabolism that it is extremely difficult to produce an iron deficiency in laboratory animals by using ordinary iron-low diets, and of the fact that the incriminated pastures contain considerable quantities of iron from the physiological point of view even where the analytical figures are low by comparison with other pastures, the author has difficulty in accepting the views of Aston.

He considers that the real aetiology of bush-sickness is still in doubt and that the anaemia may only be a symptom, pointing out that the main evidence for iron deficiency is the fact that administration of iron prevents and cures the disease. He then quotes cases such as chlorosis in human beings which cannot be ascribed to iron deficiency although, like bush-sickness, it is an anaemic condition yielding to therapeutic treatment with iron salts ; and gossypol poisoning, a wasting disease which can be prevented by feeding an iron salt along with the toxic cotton-seed meal.

[Although the function of the destructive critic is sometimes overrated, the scepticism of the author will serve a very useful purpose if it stimulates veterinarians to fill in the gaps in the aetiology and pathology of diseases studied so far mainly from the standpoint of the agricultural chemist].—H. H. GREEN.

I. WRIGHT, C. M., & TAYLOR, N. H. (1931). **A Successful Experiment on Sheep-Sick Country in Mairoa District.**—*New Zealand J. Sci. & Tech.* **13.** 57-75. 6 figs., 2 tables, 3 maps. [3 refs.]

II. MILLER, W. C. **Some Observations on " Sheep-Sick " Land.**—*Vet. J.* **88.** 167-174.

I. Collaborative work between Wright from the agricultural aspect and Taylor of the New Zealand Geological Survey from the point of view of soil profiles. The condition of " sheep-sickness " is not defined from a veterinary point of view, but appears to be characterized by general malnutrition and secondary

parasitization, in which difficulty is experienced in carrying ewes through the breeding season and in rearing of lambs, mortality amongst the latter often being high in the first few weeks of life.

The soils concerned are derived from volcanic ash, sand from sandstones and clay from weathering shales. Four soil types are described, the disorder being most marked on the " Mairoa loam " and " sandy Mangapohue."

Top-dressing the pasture with lime and phosphates, generally 5 cwt. of lime and 2 cwt. of superphosphate per acre [see ASTON (1932). this *Bulletin*. **2.** 390.], effected marked improvement in botanical condition, carrying capacity for breeding ewes and ability to rear healthy lambs to the fattened stage.

[It would be of both scientific and practical interest to have precise information on the nature and degree of parasitization in relation to the ostensible mineral deficiency].

II. A general article contributing no new data, discussing the causes of British pastures " going sheep-sick "—a vague term with varying meaning in different districts and bearing no relation to the " sheep-sickness " of the preceding article.—H. H. GREEN.

IMMUNITY.

HOFFERBER, O., & WINTER, S. G. (1932). Isohämagglutinationen und Blutgruppen bei Rindern. [**Iso-agglutination and Blood Groups in Bovines**].—*Arch. wiss. prakt. Tierhlk.* **64.** 510-517. 6 tables. [12 refs.]

In 4,077 combinations made with blood from 133 bovines of Shorthorn, Jersey, Hereford or Holstein breeds, slaughtered in America, iso-agglutination was demonstrated 71 times (1·74 per cent.). In 2,500 combinations with blood from 50 crossbred bovines, slaughtered in Germany, iso-agglutination was demonstrated 15 times (0·6 per cent.). The reactions occurred both at room temperature and at 37° C. The results were combined and are grouped as follows :—Group I, O with o or α, β (α β) : Group II, A with o or β : Group III, B with o or α. The structures AB and O α β were not observed. The absence of certain groupings is discussed.—A. W. STABLEFORTH.

SCHERMER, S., HOFFERBER, O., & KAEMPFFER, A. (1932). Weitere Untersuchungen über die Blutgruppen des Pferdes einschliesslich ihrer Vererbung. [**Further Investigations on Blood Groups of Equines including their Heredity**].—*Arch. wiss. prakt. Tierhlk.* **64.** 518-529. 3 tables, 2 charts. [23 refs.]

A tabulated summary is given of the findings of the various workers who have studied iso-agglutination in equines. The authors then give their results for 458 horses examined in groups of 50 × 50 to 75 × 75 and combine them with their earlier results for 50 horses.

The experiments on these 508 horses have confirmed the existence of the usual four groups as well as the existence of " accessory " groups, with apparently unphysiological structures such as AB$\alpha\beta$. These were particularly in evidence in one series of 900 cross tests from 75 horses. The observations indicate that the secondary groups have several causes and make it probable that a distinction is to be made between an only apparently unphysiological structure, e.g. A_1 α_2, and an actually unphysiological structure such as A_1 α_1.

The existence of actually unphysiological structures is believed to arise from hereditary influences, e.g., where a parental combination Aβ × Bα gives children AB$\alpha\beta$.

These investigations of hereditary influences have shown the dominance of the cell factors A and B over O in the horse, as well as in human beings, the sheep and the pig.—A. W. STABLEFORTH.

WELLS, A. Q. (1931). **Variations in the Antigen Content of Serum in Disease.**—*Lancet.* **221.** 1348-1349. 1 chart. [5 refs.]

The experiments reported are of a preliminary nature. Precipitin antigen content was measured by methods based on those of DEAN and WEBB : falling amounts of each serum were titrated against a constant amount of antiserum in order to find the antigen-antibody ratio giving optimal flocculation.

Sera from 8 normal sheep, 6 normal hens and 13 normal men were titrated against the appropriate antisera ; the results were in agreement with those of DEAN and WEBB on horses in showing that the antigenic content of the serum of any one species is constant under normal conditions.

In a mixture of two antisera for human serum two zones appeared ; it is suggested that this is due to the fact that two antibodies were present, in one case anti-albumin and in the other antiglobulin.

Sera from four nephritic patients differed markedly from normal human sera ; according to one antiserum their antigenic content was decreased, whilst according to the other it was increased ; the connection of these findings with those of other workers regarding the variations of albumin and globulin in nephritic sera are discussed.

In one horse the antigen content and total protein content of the serum before and at intervals after a severe bleeding showed remarkable agreement.

—A. W. STABLEFORTH.

DETRE, L. (1931). Immunitástani szemle. I. A vércsoportok jelentöségérol. II. Lépfene. III. Száj-és körömfájás. IV. Baromfidiphtheria. V. Abortus. [**Immunological Review. I. On the Significance of Blood Groups. II. Anthrax. III. Foot and Mouth Disease. IV. Fowl Pox. V. Abortion**].—*Allategészségügy.* **11.** 84-86 and 95-97.

This article reviews certain recent developments in the field of immunology.

I. The author briefly points out the great significance of recent discoveries made on the subject of blood-grouping by LANDSTEINER, DUNGERN and HIRSCHFELD. Blood-group studies in animal physiology are so far much less developed than in human physiology and in the author's opinion further knowledge might be of value.

II. The details on anthrax concern human conditions.

III & IV. Brief mention is made of the successful cultivation of the virus of foot and mouth disease as reported by HECKE [(1931). *Zlb. Bakt. I.* (*Orig.*). **119.** 385.] and on some recent investigations on the immunity in fowl pox.

V. The author reviews the results which have recently been obtained in investigations on the diseases caused by brucella, with particular reference to the various new methods advocated by SCHÄFER and by GRAHAM and THORP for prompt diagnosis ; he also discusses certain phenomena which may have unfavourable influences on the results of agglutination tests and, finally, deals with the incidence of Bang infection in fowls.—A. KOTLÁN (BUDAPEST).

RAMON, G., & LEMÉTAYER, E. (1932). L'immunisation active des animaux domestiques par l'anatoxine tétanique ; voie d'introduction de l'antigène. [**Active Immunization of Domestic Animals with Tetanus Anatoxin ; Route of Inoculation of the Antigen**].—*C. R. Soc. Biol. Paris.* **109.** 827-829. 1 table. [3 refs.]

The authors have superseded their old method of subcutaneous inoculation by intramuscular inoculation ; in the horse the material is injected in the region of the neck and very little inflammatory reaction occurred in 15 horses which they inoculated in this manner with anatoxin + tapioca and in five done with anatoxin + calcium chloride. The resultant antitoxic value of the sera varied from 0·1 to 40 international units per c.c., comparing very favourably with sera obtained from parallel subcutaneous inoculations.—NORMAN HOLE.

GLOVER, H. R. (1931). **The Double-Intradermal Tuberculin Test.**—*Vet. Rec.* **11.** 1158-1159.

GLOVER, H. R. (1932). **Tuberculin Testing.**—*Ibid.* **12.** 390-398. 11 tables.

The author recommends the double-intradermal test as more exact than either the sub-palpebral or sub-caudal methods. A description of the technique is given and the importance of the character rather than the size of the swelling is emphasized. The standardization of tuberculin preparations is desirable.

In the discussion, GOFTON described his experiences in two herds with both subcutaneous and double intradermal tests ; with the latter he obtained more doubtful reactors which appeared to be negative on *post-mortem* examination. —NORMAN HOLE.

PLUM, N. (1932). Kvægtuberkulins, Fjerkrætuberkulins og Paratuberkulins (Johnins) Evne til at fremkalde Reaktioner hos Dyr inficerede med henholdsvis Kvæg-, Fjerkræ- og Paratuberkulose. [**Reactions with Bovine and Avian Tuberculin and with Johnin in Cattle infected with Tuberculosis of Bovine and of Avian Origin and with Johne's Disease**].—*Kgl. Vet.-og Landbohøjskole Aarsskr. Copenhagen. 1932.* pp. 81-112. 10 tables.

In two previous papers on the intradermal tuberculin test in cattle, Plum has pointed out the great significance of avian tuberculous infections of cattle with regard to the sensitization of the infected animal to tuberculin, so that reaction to intradermal tests with avian and even with bovine tuberculin may be observed, even if the animal is not suffering from tuberculosis of the bovine type.

Cattle suffering from Johne's disease react to avian tuberculin. Before our knowledge of the relatively high frequency with which avian tuberculosis occurs in cattle, a reaction to avian tuberculin would have been considered to mean that the animal was infected with Johne's disease. Now it means that the animal is infected with avian tubercle bacilli, Johne's disease or with other acid-fast bacilli. [See also this *Bulletin.* **2.** 261].

Simultaneous intradermal tuberculin tests with bovine and avian tuberculin as well as johnin (supplied by Dr. Minett, Research Institute for Animal Pathology, London) were undertaken on about 200 cattle suffering from bovine and avian tuberculosis and Johne's disease respectively. It was found that cattle suffering from bovine tuberculosis present approximately the same slight reaction to johnin and to avian tuberculin.

In cattle infected with avian tuberculosis some time previously (about a year), the reaction seems to be a little stronger to avian tuberculin than to johnin, while in recently infected cattle there appears to be a considerably stronger reaction to avian tuberculin than to johnin (in this instance the positive results with johnin being only about half the number of positive results with avian tuberculin).

In cattle suffering from Johne's disease the following observations have been made :—the reaction is stronger to avian tuberculin ; in one of the herds tested the reaction produced by avian tuberculin was nearly twice as large as that of

johnin ; in another herd in which Johne's disease was supposed to be latent (in which the disease could not be observed clinically), as well as avian tuberculosis of unknown origin, reactions to johnin proved to be stronger than those to avian tuberculin. It is therefore considered that it is incorrect to assume that johnin can be used for the differential diagnosis of avian tuberculosis and Johne's disease. The paper gives several illustrations of the importance of avian tuberculosis in relation to the tuberculin test of cattle.—H. LORENZEN (SØNDERBURG).

I. MONTGOMERIE, R. F., & ROWLANDS, W. T. (1932). **A Comparison of the Blood and Milk Agglutination Tests in the Detection of Bovine Contagious Abortion.**—*Vet. J.* **88.** 227-236. 2 tables. [16 refs.]

II. GILMAN, H. L. (1932). **Brucella Agglutinins in the Blood of Ewes.**—*Cornell Vet.* **22.** 187-188. [1 ref.]

I. Montgomerie and Rowlands made a comparative study for the presence of *Br. abortus* agglutinins in 615 samples of blood serum and milk from 314 cows of known history. The object of the investigation was to determine whether an agglutination test of milk whey would be of value in detecting infected animals, the blood serum of which fails to react to the agglutination test until after calving. The agglutination tests of blood serum and milk whey were in agreement in 88·5 per cent. of the samples.

" An attempt to determine which result was reliable, or the more reliable, has been made by a search of the history, breeding and agglutination reaction in previous and subsequent blood tests, of the cows from which the samples were obtained. It will be appreciated that in a number of cases the indication obtained was insufficient to permit a decision as to whether the cow was infected or not *at the time of the test.*"

A positive reaction with milk whey in a dilution of 1 : 10 and, in the case of serum, complete agglutination in a dilution of 1 : 40, was accepted as indicating infection. An interesting observation was that whey from the udder secretion of almost dry non-infected cows may give a high titre in the agglutination test.

It would appear from the results obtained that whey is not so reliable as blood serum, but in view of the ease with which milk samples can be obtained it is, as the authors suggest, a method which might with advantage be more frequently employed.

II. Gilman carried out agglutination tests of the blood of 544 breeding ewes for the detection of *Br. abortus*. Five hundred gave a negative reaction in a dilution of 1 : 20 and eighteen gave a positive reaction. Two gave a positive reaction in a dilution of 1 : 40.—T. M. DOYLE.

I. REICHE, F. (1931). Zur Blutkörperchensenkungsgeschwindigkeit. [**On the Sedimentation Rate of Blood Cells**].—*Zlb. inn. Med.* **52.** 810-811.

II. HERRMANN, R. (1931). Essai d'interprétation de la réaction de la vitesse de la sédimentation globulaire dans la tuberculose. [**An Attempt to Interpret the Blood Sedimentation Test in Tuberculosis**].—*Rev. Tuberc.* **12.** 552-566. 7 figs., 1 table.

[The blood sedimentation test consists of observing, in citrated blood, the speed with which the red cells settle out from the plasma and may be carried out in graduated tubes or in small pipettes, the quantity of blood varying correspondingly from 5 c.c. to a few drops. One volume of citrate is mixed with four volumes of blood, and the degree of sedimentation is recorded at intervals. A

reading at the end of one hour is usual and the result is sometimes referred to as the sedimentation index. (The normal index for men varies from 2 to 8 mm., that for women from 2 to 12 mm.). Some workers make observations at later times, whilst others (CUTLER) consider that the value of the test is enhanced by tracing a curve of the fall at short intervals during the first hour.

The test is not specific but some increase of the sedimentation rate occurs in many infectious and destructive diseases. It has therefore little diagnostic value. In prognosis, however, particularly in tuberculosis, determinations of the sedimentation rate are regarded by many as an aid in estimating the activity of disease. CUTLER—(1926). *Amer. J. Med. Sci.* **171.** 882.—believes that for this purpose the test is more reliable than the temperature curve, pulse rate or weight chart, whilst CUMMINS and ACLAND—(1927). *Tubercle.* **9.** 1.—conclude that, although it provides no new information unobtainable by ordinary clinical observations, it affords an additional method of measuring the constitutional balance before, during and after treatment. WESTERGREN—(1924). " Die Senkungsreaktion." Berlin: Julius Springer—who has done much work with this test, finds that a normal sedimentation rate is never found in active tuberculosis].

I. From the results of 8,000 tests on about 6,000 persons it is concluded that a positive result can be traced to pathological processes, but that a negative result does not exclude such, and that the degree of increase in the rate of sedimentation does not run parallel to the condition. The test may be of value in differentiating organic and functional disease, or inflammatory and non-inflammatory arthritis. Serial tests are of value in the prognosis of cases of pulmonary tuberculosis and of pleurisy.

II. It is concluded that the blood sedimentation test is not specific for tuberculosis, but that diverse toxins, e.g. in certain infectious diseases, cancer and syphilis, may act on the red cells in the same way as do the toxins of tuberculosis. In tuberculosis, the sedimentation curve does not indicate the extent of the lesions or their evolution, but the phases of intoxication.

—A. W. STABLEFORTH.

I. KOWARSKI, A. (1931). Zur Methodik der Mikrobestimmung der Senkungsgeschwindigkeit der roten Blutkörperchen. [**Micro-determination of the Sedimentation Rate of Red Blood Corpuscles**].—*Klin. Wschr.* 1863-1864. 1 table. [2 refs.]

II. HÖCKER, H. (1931). Vergleichende Untersuchungen und eine Vergleichskurve über die Blutsenkung nach der Westergrenschen Methode und der Mikromethode nach Langer und Schmidt. [**Comparative Experiments and a Curve for Comparison of the Blood Sedimentation by Westergren's Method and the Micro-Method of Langer and Schmidt**].—*Münch. med. Wschr.* **78.** 1556-1557. 1 fig. [3 refs.]

I. The micro-sedimentation method described gives values which agree well with those of the standard method of Westergren. The agreement is obtained by using one part of citrate to 2·5 parts of blood instead of the usual proportions. 0·22 c.c. of blood is required.

II. The micro-method of Langer and Schmidt, which only requires a few drops of blood, is reliable. The values obtained after one hour in tests of 100 samples of blood were compared with those obtained by Westergren's method. In 85 per cent. of 56 normal samples the two tests were in agreement. In the case of more rapid sedimentation the values obtained by the micro-method were 1·9 to 2·76 times smaller. The relations are shown graphically.

—A. W. STABLEFORTH.

PUBLIC HEALTH.

SAVAGE, W. G. (1931). **Routine Veterinary Inspection of Dairy Cattle : mainly from the Point of View of Tuberculosis.**—*Vet. Rec.* **11.** 1271-1273 and 1275-1276.

The author is of the opinion that the application of the Tuberculosis Order shows that the removal of grossly infected cows is not an important factor in reducing the incidence of bovine tuberculosis and that, on the other hand, there is abundant evidence that slight, clinically unrecognizable cases readily spread the disease. Thus the examination of cows and the withdrawal of those clinically infected alone play a limited part in reducing the amount of tubercle-infected milk and are not worth the heavy undiminishing expense entailed ; in other words, it is scientifically unsound to rely on clinical veterinary inspection to prevent the milk supply from conveying tubercle bacilli.

Savage considers that better results are derived from what he describes as the cheaper and more effectual system of bulk sampling followed by concentration on infected herds by veterinary examination and the employment of biological tests.

EATON JONES, Chief Veterinary Officer for the City of Liverpool, in a spirited reply, gives the following interesting figures taken from the examination of 3,850 dairy cows as compared with bulk sampling during the years 1925 to 1930 inclusive :—

	Cases of tuberculous mastitis discovered.
Bulk sampling (1,615 samples)	21
Routine veterinary examination	68
Notifications from owners	38

EATON JONES adds that in Lanarkshire, Scotland, out of 64 cases dealt with in 1930, 47 (81 per cent.) were found on herd inspection and that, in the West Riding of Yorkshire, out of 292 cases dealt with in the year 1929-30, 207 (70 per cent.) were discovered as the result of herd examination. The percentage of clinical cases discovered rose from 16·15 per cent. to 35·1 per cent. in the years 1927 to 1930. Continuing, he points out that in bulk sampling the result is not obtained until a month has passed, while, in his experience, when the microscope is properly used, it is practically never necessary to use guinea pigs when dealing with single milks. He adds that he has found a clinically developed case in a small herd from which a bulk sample has been taken and returned negative.—T. DUNLOP YOUNG.

SMITH, J. (1932). *Brucella Abortus* **in Milk.**—*J. Hyg. Cambridge.* **32.** 354-366. 4 tables. [21 refs.]

An investigation into the incidence of *Br. abortus* and tubercle bacilli in milk collected on a basis arranged by the Department of Health for Scotland, and carried out at the City Hospital Laboratory, Aberdeen, has shown *Br. abortus* to be present in 79 (28·3 per cent.) of 279 different samples of raw milk, and *M. tuberculosis* in 29 (10·3 per cent.) of the same samples.

In a total of 379 samples collected from eight pasteurizing plants, 36 (9·4 per cent.) were found to contain *Br. abortus* and 23 (6 per cent.) tubercle bacilli.

With regard to the relative value of " holding " and " flash " pasteurization the following figures are instructive :—from 187 samples treated by holding pasteurization at 145° F. for 30 minutes, *Br. abortus* was not obtained, but four (2·1 per cent.) samples showed the presence of tubercle bacilli.

From 192 samples treated by " flash " pasteurization, 36 (18·7 per cent.) were found to contain *Br. abortus* while 19 (9·8 per cent.) contained tubercle bacilli.—Ll. E. W. Bevan.

Flückiger, G. (1932). Etiologie des intoxications d'origine carnée et examen bactériologique de la viande. [**Aetiology of Food Poisoning and the Bacteriological Examination of Meat**].—*Schweiz. Arch. Tierhlk.* **74.** 13-27.

The author reviews the possible causes of meat poisoning and mentions those members of the salmonella group which may cause disease in human beings and in animals. Under his *Bact. paratyphosum* B group he classifies *Bact. paratyphosum* A, a human pathogen, *Bact. paratyphosum* B Erzindjan [most strains of this type are *Bact. paratyphosum* C] also a human pathogen. He makes no attempt to divide *Bact. suipestifer* which is stated to be generally non-pathogenic for man, into types. [There are many records of its pathogenicity]. *Bact. abortus equi*, *Bact. abortus ovis* and the Voldagsen types are included as non-human pathogens.

His next group consists of *Bact. enteritidis*, which he affirms is normally present in the intestine of animals ; on this point he is frankly in disagreement with many other authors. The rat strains and those pathogenic for calves (Jensen's para-colon bacillus—now known to be the Dublin type) are also included.

His third group consists of the Breslau bacillus—*Bact. aertrycke*—and *Bact. typhimurium* [most of these are *Bact. aertrycke*]. He admits that it is difficult to draw a strict line of demarcation as to those which are pathogenic or non-pathogenic for man and the various animal species. His main concern is those pathogenic for both man and animals and these are important in the inspection of meat.

For the examination of meat he recommends removing two portions of muscle, two lymphatic glands and portions of spleen, liver, kidney and bone marrow. Plate cultures on Endo agar, Drigalski's agar, malachite green and Gassner's agar are prepared and grown for 24 hours. The author maintains that suspicious cultures can be examined further and that it may be two or three days before a result is obtained, whilst the meat from which non-suspicious cultures have been obtained need not be detained.—R. Lovell.

Hülphers, G. (1932). Desinfektions försök med kloramin på mjölknings-maskiner. [**Disinfection Experiments with Chloramine for Milking Machines**].—*Skand. Vet.-tidskr.* **6.** 295-301. 1 fig., 2 tables. [Summary in English : abst. from orig.]

An analysis is presented of experiments undertaken to test the suitability of chloramine as a disinfecting agent for the cups and tubes of an Alva-Laval or similar type of milking machine. Chloramine [p-toluene sodium sulphochloramide] is sold in Sweden under the trade name of " sterisol."

The machine and tubes were filled with bouillon cultures of *Bact. coli* and staphylococci and, after emptying were again filled for varying intervals of time with solutions of chloramine of known strength. The *coli* organisms were killed with a 1 : 20,000 and the staphylococci with a 1 : 10,000 solution, in three hours. Other tubes were immersed in milk to which had been added pure cultures of staphylococci and *Bact. coli*. Subsequent filling of the tubes with a 1 : 2,500 solution of chloramine or a 1 : 2,500 solution of equal parts of chloramine and sodium chloride (so-called " sterisol-B ") killed all organisms within three hours.

Experiments were made to ascertain the effect of immersing the cleaned units in a 1 : 2,500 solution of chloramine between, for instance, the morning and evening milking, using the bacterial count of the milk as a criterion. Milk obtained through units which had been treated with the chloramine solution contained

an average of 2,514 organisms per c.c. Milk drawn through units cleaned in the usual manner, but not soaked in chloramine solution, contained on an average 9,344 bacteria per c.c. The disinfecting agent imparted no taste to the milk.
—G. B. Brook.

PHYSIOLOGY.

I. Lampe, K. W. (1931). Die Temperaturverhältnisse in den Vormägen und dem Labmagen des Schafes mit Hinweisen auf den Weg, den bei diesem Tier getrunkene Flüssigkeit nimmt. [**The Relation between the Temperature of the Fore Stomachs and Abomasum of the Sheep with Reference to the Path taken by Fluids drunk by this Animal**].—*Inaug. Diss. Leipzig.* pp. 48. numerous tables. [15 refs.]

II. Krzywanek, W., & Lampe, K. W. (1932). Ueber den Flüssigkeitstransport durch die Vormägen des Schafes. [**On the Course taken by Fluids through the Fore Stomachs of the Sheep**].—*Deuts. tierärztl. Wschr.* **40.** 289-293. 1 fig., 1 table, 1 chart. [7 refs.]

III. Ross, I. Clunies. (1931). **The Passage of Fluids through the Ruminant Stomach.**—*Austral. Vet. J.* **7.** 122-134. 8 tables. [6 refs.]

I. The work forming the subject of this dissertation is a continuation of part of Professor Krzywanek's research on the physiology of ruminant digestion [(1929). *Pflügers Arch. Physiol.* **222.** 89]. The five-year-old sheep used for the work was prepared by cutting a large permanent ruminal fistula through which the thermo-electrical apparatus was passed into each division of the stomach. The apparatus is described in detail only in Krzywanek's article. Twenty-five separate experiments were made and Lampe records the temperature of different pairs of gastric compartments in each case. In this paper detailed descriptions of some of the more valuable results only are given.

It was found that the normal temperature for all parts of the stomach was 39° C. ; the digestion of hay caused a rise in temperature and the administration of cold liquids and roots caused a slight fall which sometimes persisted for some hours.

The author suggests with regard to the oesophageal groove reflex that the proportion of fluid already present in the rumen might have an influence on the action of the groove, as in the case of his own observations, cold water caused closure whilst milk did not. This suggestion is contrary to the findings of Wester.

The thermometrical apparatus gave an accurate indication of the destination of the fluids given to the sheep, thus serving as another method of determining the path taken by certain ingesta.

II. This is substantially the same as the subject of Lampe's dissertation.

III. This is an important contribution to the physiology of ruminant digestion, particularly as many sheep were used—140 animals all below two years of age.

The experimental work was performed on the lines of that done by Wester in cattle [(1926). " Die Physiologie und Pathologie der Vormägen beim Rind." Berlin : Schoetz].

[Wester found that solutions of various salts, milk and blood serum, when administered to immature cattle, elicited the oesophageal groove reflex, i.e. the oesophageal groove closed and the fluids passed direct to the omasum and abomasum].

The author dosed several series of young sheep with solutions of 5 per cent. sodium bicarbonate, water, 1 to 10 per cent. zinc sulphate, 2 per cent. copper sulphate, sheep serum and 1·5 and 2 per cent. sodium chloride ; carmine was added to all of these to give an indication of the compartment reached by the solution. The doses were given to animals deprived for varying intervals of water or food or both ; the animals were killed after being dosed and their stomachs were examined without delay. The results of these experiments are set out in eight tables which give full information at a glance.

Taken as a whole this work does not support WESTER's belief in the specific action of solutions of salts, although it appeared that zinc sulphate has some influence on the closure of the oesophageal groove. It was found that the destination of fluids given as a drench was influenced by food and particularly by water deprivation. In about 80 per cent. of sheep dosed after 40 hours water starvation, all the fluid went straight to the abomasum : it went to the same destination in about half of all sheep deprived of water for from 18 to 24 hours and in about one third of those not deprived of water.

This work shows that, with regard to anthelmintic treatment, a period longer than 24 hours without water prior to dosing should be instituted.—J. E.

STÅLFORS, H. (1931). Graviditetsdiagnos genom urinen. [**The Diagnosis of Pregnancy through the Urine**].—*Svensk Vet.-tidskr.* **36.** 301-310.

The author gives a description of the modern methods for the diagnosis of pregnancy at an early stage and comments especially on the Ascheim-Zondek test. He has found that the test is not suitable for use with cattle.

—N. LAGERLÖF (STOCKHOLM).

KÜST. (1931). Die Trächtigkeitsfeststellung bei unseren Haustieren durch den Nachweis der Sexualhormons in Harn. [**The Diagnosis of Pregnancy in our Domestic Animals by the Demonstration of the Sexual Hormone in the Urine**].—*Deuts. tierärztl. Wschr.* **39.** 738-741.

This was one of the papers presented at the sixth meeting of workers on diseases of breeding animals held at Leipzig in October.

In his introduction the author summarizes the knowledge of the Ascheim-Zondek reaction [demonstration of hypophyseal hormone in the urine] for pregnancy in women and instances this as an example of the fact that results obtained with one animal species do not hold good with other species. The A-Z reaction has no significance in relation to the common domestic animals, but research into this field has shown that the ovarial hormone is excreted in the urine of some animals and may be demonstrated by a biological test.

Pregnancy in mares can be regularly diagnosed by the inoculation of their urine or blood serum into immature female white mice. The hormone causes changes in the uterine tubes, uterus and vagina of mice ; this takes the form of an oestral cycle, which is differentiated into four stages—dioestrus, proöestrus, oestrus and metoestrus. For practical application microscopic examination of the vaginal secretion is made and characteristic changes are demonstrable at each stage. The original should be consulted for the technical details.

Results obtained by the author on 439 mares have yielded 100 per cent. successful results, pregnancy being recognizable from the 30th day after conception in many cases and with certainty from the 42nd day.

The urine of pregnant cattle contains no hypophyseal hormone, but intermittently it does contain some ovarian hormone : its presence is, however, not sufficiently regular for the method to be applicable in practice. The same holds

good with goats and swine. No hypophyseal nor ovarian hormone has yet been demonstrated in the urine of pregnant dogs.

In the discussion COHRS referred to the evident lack of uniformity in human and animal sexual physiology and in that of the various species of animals. STANG gave an account of his experience with the biological diagnosis of pregnancy in mares.—J. E.

FLETCHER, W. M. (1932). **The Urgency of Nutritional Studies.**—*Nutrit. Abst. & Rev.* **1.** 353-358.

A general essay from a distinguished pen published in the first volume of a new journal, selecting illustrative material from recent researches, emphasizing the practical significance of nutritional studies and justifying the raison d'être of *Nutrition Abstracts and Reviews* on grounds of direct utility to workers in many branches of science.—H. H. GREEN.

CRICHTON, J. A. (1931). **The Mineral Requirements of Dairy Cattle.**—*J. Dairy Res.* **2.** 1-37. 6 tables. [124 refs.]

A review of our knowledge of mineral metabolism and the mineral requirements of the dairy cow. The calcium and phosphorus requirements are dealt with fully. The diets of hand-fed calves are liable to be deficient in certain elements and also in those factors necessary for the assimilation of calcium. The condition of the calves is improved by the addition of a suitable mineral mixture and some cod liver oil. Growing animals at pasture may suffer severely if the land is especially deficient in some mineral, but generally speaking good pasture supplies an abundance of the necessary minerals. There is little evidence to suggest that indoor-fed growing animals suffer from a deficiency of calcium or phosphorus. For milking cows the minerals of good pasture suffice, but a deficiency of phosphorus in poor pastures may limit milk production. In indoor feeding of milk cows the cereals and other concentrates used, although rich in phosphorus, are deficient in calcium and this may have an adverse effect on the milk yield. Further, owing to the loss of calcium in the milk, the presence in the ration of a sufficient amount of calcium is very important. Factors influencing the assimilation of calcium, such as sunshine, cod liver oil, etc., are also important. Generally with heavy milkers there is a gradual depletion of calcium and hence it is advisable to build up large stores of phosphorus and calcium whilst the animal is dry. Shortage of calcium with its resulting depletion has an adverse effect on reproduction.

Both on grazing and on indoor feeding there is liable to be a shortage of chlorine which should be made good by the addition of common salt. In some districts deficiency of iodine has affected reproduction and there is some evidence to suggest that it may affect milk yield. Information is gravely lacking concerning the other minerals present in milk.

The addition of inorganic salts to deficient rations is not so efficient a method of ensuring for the cow a sufficiency of minerals as to grade up pastures and crops so that their mineral composition more and more closely resembles that of milk.

—W. R. WOOLDRIDGE.

THERAPEUTICS.

QUIN, A. H., Jr. (1932). **Some Peculiarities of Anthelmintics.**—*North Amer. Vet.* **13.** No. 3. 36-38.

Anthelmintics are dangerous drugs and should be handled with care. A weakened constitution renders an animal susceptible to their toxic action and for this reason preliminary fasting must not be too prolonged. Instances are given of deaths in pigs and dogs following treatment with oil of chenopodium and of one instance where two thirds of a flock of lambs suffering from a severe infestation of stomach worms were lost as a result of a simultaneous dose of copper sulphate and kamala. It is pointed out that Epsom salts and Glauber salts must be well diluted for administration to fowls, that geese are particularly sensitive to santonin and that turkeys cannot tolerate kamala as well as chickens can. Fourteen out of 16 turkeys died following a dose of 15 grains each.—E. L. Taylor.

Wright, W. H., & Bozicevich, J. (1931). **Control of Gastrointestinal Parasites of Sheep by Weekly Treatments with Various Anthelmintics.**—*J. Agric. Res.* **43.** 1053-1069. 2 figs., 2 tables. [16 refs.]

Weekly treatments were tried with 100 c.c. of a 1 per cent. solution of copper sulphate on three sheep, 5 c.c. of carbon tetrachloride on two sheep and 5 c.c. of tetrachlorethylene on two sheep, two others being kept as controls. The sheep were confined throughout the experiment to small pens 7 by 24 feet in order that they might be exposed to continuous heavy reinfestation. The weekly dosing was continued for over a year and it was found that copper sulphate all but eliminated *Haemonchus contortus* but had no action on other species: carbon tetrachloride caused the death of the two sheep after 33 and 34 doses respectively; it had apparently removed *H. contortus* and *Bunostomum trigonocephalum* but not the smaller trichostrongyles nor nodular worms: tetrachlorethylene caused no harm to the sheep and apparently controlled *H. contortus* and *B. trigonocephalum*.

Four of the experimental sheep were pregnant ewes and gave birth to lambs in a normal way during the course of the experiment.

It is thought that a combination of weekly dosing with copper sulphate or tetrachlorethylene and less crowded conditions of sheep grazing will prove a valuable aid to the control of verminous gastritis.—E. L. Taylor.

Ricaud, Camus, & Chevalier. (1931). Sur l'emploi des pyrethrines dans le traitement des bronchites vermineuses des bovidés. [**The Use of Pyrethrines in the Treatment of Verminous Bronchitis in Cattle**].—*C. R. Acad. Agric. Paris.* **17.** 682-686.

Pyrethrines dissolved in oil were tried on 100 cattle affected with verminous bronchitis; the curative results appear to have been practically perfect and no untoward effects on the animals were observed. This confirms the results obtained by Roger and Ricaud [see this *Bulletin*. **1.** 250]. [Details of the authors' observations, age of the animals, severity of infection, dose of drug, etc. are not given].—E. L. Taylor.

I. Stålfors, H., & Lagerlöf, N. (1932). **Milk Fever Paresis Puerperalis in the Light of Recent Investigations—Experiments with Calcium Therapy.**—*Cornell Vet.* **22.** 29-40. [22 refs.]

II. Sjollema, B., Seekles, L., & van der Kaay, F. C. (1932). Zur Kalziumtherapie bei der Gebärparese des Rindes. [**On Calcium Therapy in Milk Fever**].—*Deuts. tierärztl. Wschr.* **40.** 149-150. [18 refs.]

III. Schlichting, H. (1932). Die Behandlung der Gebärparese mit Glukose A.O.I.-Bengen und Chlorkalziumlösungen. [**Treatment of Milk Fever with Glucose A.O.I.-Bengen and Calcium Chloride**].—*Berl. tierärztl. Wschr.* **48.** 196-198. [32 refs.]

Three papers on the same topic.

I. The authors review the literature from 1896 to 1929 and then compare the calcium treatment based upon the hypocalcaemia incident to the disease with the standard udder inflation treatment regarded by SJOLLEMA as functioning by stimulation of the parathyroids, *via* the sympathetic nervous system and consequent restoration of the normal level of blood calcium.

They survey 33 cases arising in the ambulatory clinic of the Stockholm veterinary college during 1929 to 1930, treated by injection of calcium chloride sometimes associated with udder inflation. Blood calcium was determined in 20 cases and the degree of hypocalcaemia found proportional to the seriousness of the case. Additional cases the following year were treated with calcium gluconate.

On the whole results were satisfactory, but relapses were not infrequent and the authors finally recommend the older inflation procedure in preference to calcium therapy on the grounds that risk of phlebitis is avoided, that relapses are less frequent and that no cost is entailed for medicinals.

In difficult cases, however, calcium therapy is regarded as very useful in combination with udder inflation and even alone when inflammation of the udder renders inflation undesirable.

II. This is a paper arising out of an earlier publication by KRÜGER [(1931). *Deuts. tierärztl. Wschr.* **39.** 305.] in which treatment with calcium chloride is recorded as affecting the heart. The authors point out that their own numerous earlier cases [(1930). *Tijdschr. Diergeneesk.* **57.** 1229, 1285 and 1341.] included various types of cardiac frequency curves of which the most dangerous was characterized by marked acceleration during and after the injection, sometimes followed by heart-block and occasionally by death. They ascribe this to mineral inbalance in the blood and in place of plain calcium solutions substituted 40 g. crystalline calcium chloride and 15 g. crystalline magnesium chloride dissolved in 300 c.c. of water, so succeeding in abolishing the unfavourable action of the calcium on the heart.

They report that during the year 1931 the calcium-magnesium therapy has been tried by Dutch veterinarians in at least 2,000 cases without untoward effects. Slow injection over a period of not less than four minutes is emphasized, with exclusion of cases which show irregular heart action before treatment.

III. The A.O.I.-Bengen referred to is a proprietary preparation of unrevealed composition and universal panacea claims. The author's report is adverse. Glucose injections are regarded as useless. Calcium chloride was used in 20 cases, of which 11 responded to single injection and 9 relapsed. A second injection within six hours is advised.—H. H. GREEN.

STECK, W. (1931). Chemische Behandlung bakterieller Krankheiten. [**Chemical Treatment of Bacterial Diseases**].—*Schweiz. Arch. Tierhlk.* **73.** 109-122. 6 tables. [5 refs.]

A general paper given before the Veterinary Association of Bern, in which the author critically reviews chemotherapeutic methods in use for treatment of bacterial diseases, and includes a few personal experimental observations on the use of acridin derivatives in streptococcic mastitis.—H. H. GREEN.

POISONS AND POISONING.

SVENSSON, S. (1932). Om fosforförgiftning och dess påvisande enl. Mitscherlich. [**On Phosphorus-Poisoning and its Detection in accordance with**

Mitscherlich].—*Skand. Vet.-tidskr.* **22.** 320-330. [8 refs.] [Summary in English : abst. from orig.]

The author investigated the application of the Mitscherlich test to cases of phosphorus poisoning in animals.

Experiments *in vitro* showed that elementary phosphorus, when added to equine blood, persisted unchanged for a considerable period and could therefore be detected by the test ; the test was negative when applied to mixtures of phosphorus and calf liver. Experiments *in vivo* consisted in the administration of known amounts of phosphorus to several animals. After death the contents of the stomach and bowel, the blood and in several instances the liver tissue were subjected to the Mitscherlich test ; this proved positive in the case of the stomach or bowel contents, if carried out within two days of the ingestion of the phosphorus, but negative in the case of the liver tissue or blood as early as twelve hours after administration. The author concludes that, although elementary phosphorus remains unchanged for a long time *in vitro* in drawn blood, this is not the case in the living animal where oxidation takes place rapidly, the liver being probably responsible for this process.—G. B. Brook.

I. Krauss, W. E., & Runnels, H. A. (1931). **Preliminary Studies on White Snakeroot.**—*Ohio Agric. Expt. Sta. Bull.* No. 470. 150-151.

II. Campbell, H. W. (1931). **Poisoning in Chickens with Whorled Milkweed.** —*J. Amer. Vet. Med. Ass.* **79.** 102-104.

III. Naudin, L. (1932). Intoxication d'une Chèvre par le limbe de feuilles de rhubarbe. [**Poisoning of a Goat by Rhubarb Leaves**].—*Rec. Méd. vét.* **109.** 91-92.

I. The plant from the vicinity of Wooster was fed to a Jersey cow, at the rate of three and a half pounds a day for 47 days, without producing untoward symptoms.

The milk from the cow was fed daily to rats, rabbits, one calf and one lamb, none of which contracted " milk sickness," or showed " trembles " when fed with the plant itself. It is concluded that white snakeroot may vary in toxicity according to certain unknown factors.

II. The whorled milkweed, *Asclepias mexicana*, is widely distributed in California and other western states and is known to be poisonous to sheep, cattle and horses. It is now shown to have been responsible for considerable losses among pullets running in a yard in which the plant was growing. The symptoms noticed in the field were reproduced by laboratory feeding tests and were marked by lameness, developing into complete loss of muscular control ; the head drawn back or rotated ; on disturbance the birds would fall over backwards, struggling violently and showing convulsive movements. After 20 g. of ground fresh leaves, stems and blossoms, death occurred in coma in four days, whilst the same quantity of root produced the usual symptoms, but with recovery in ten days.

III. A goat which had browsed on the green parts of rhubarb stood with legs outspread, protruding eyes, mouth half open and foaming and uttering cries. There was sour smelling green vomit and profuse diarrhoea.

The author draws attention to the general ignorance of the dangerous character of the leaves due to their oxalic acid content.—G. D. Lander.

Blackwell, W. E. (1931). **Horses Poisoned by Bryony.**—*Vet. Rec.* **11.** 911-912.

The author records three cases of death attributable to bryony, two in Welsh ponies and one in a draught horse. In each case the animals showed symptoms

of subacute inflammation of the bowels, in two cases the bowels being torpid, whilst the third subject " dunged like a cow." In each case death occurred within two days of illness after violent pain and profuse sweating. *Post-mortem* examination revealed intense gastro-enteritis, the small intestine in particular showing alternating gangrenous dirty yellowish-green and crimson strips.

Quantities of bryony, bearing evidence of having been cropped, were found in the hedgerows and fragments of the plant were found in the ingesta.

[These are no doubt cases of poisoning by " white bryony " (*Bryonia dioica*) not to be confused with the " black bryony " (*Tamus communis*) of similar habitat and distribution].—G. D. LANDER.

SCHIEBLICH, M. (1931). Toxizität bestrahlter Ergosterinpräparate. [**Toxicity of Irradiated Preparations of Ergosterol**].—*Deuts. tierärztl. Wschr.* **39.** 750-752. [15 refs.]

This paper was presented at the sixth meeting of Workers on Diseases of Breeding Animals held at Leipzig in October.

The literature on hypervitaminosis D is reviewed [see also this *Bulletin.* **1.** 312]. Opinion is not unanimous as to whether the changes produced by overdosing with irradiated ergosterol remain or disappear after the vitamin is withdrawn. Various workers have found that the antirachitic and the toxic principles of over-irradiated ergosterol are separate and attempts to separate and isolate them are proceeding.—J. E.

MISCELLANEOUS.

BUTZ, H. (1932). Die Aufgaben und die Bedeutung der Preussischen Gestütverwaltung. [**The Work and Importance of the Prussian State Horse-breeding Establishment**].—*Deuts. tierärztl. Wschr.* **40.** 65-66. 1 fig.

MIESSNER, H. (1932). Zur 200-Jahrfeier der Preussischen Gestütverwaltung. [**On the Bicentenary of the Prussian Horse-breeding Establishment**].—*Ibid.* 67-69.

ELSNER, G. (1931). Die gegenwärtige Lage der Pferdezucht in Böhmen. [**The Present Position of Horse-breeding in Bohemia**].—*Prag. Arch. Tiermed.* **11.** 227-236.

The first two articles deal with the work of the renowned East Prussian Stud Farm at Trakehnen, which before the war produced 20,000 remounts annually for the German Army. Post-war circumstances have led to a reduction of government stallions from 839 in 1925 to 488 in 1929, and the further great reductions foreshadowed threaten to ruin the stud. Private stallion-breeding is also reduced. It is, however, hoped that the situation may yet be saved.

In Bohemia things are more hopeful. The number of mares has increased from 20,717 in 1929 to 28,482 in 1930, an increase of 37 per cent. The total number of horses in 1929 was 241,943 and 19,300 horses are needed annually to keep up this number. Only 13,500 foals can be counted on at present, so that without fear of over-production the number of mares might be increased to 35,000. The geographical distribution and statistics of stallions and mares are given and the organization of the studs is described.

TECHNIQUE.

BUGHER, J. C. (1931) **A Quinhydrone-Collodion Electrode of Special Applica-**

bility in Experimental Pathology.—*J. Biol. Chem.* **92.** 513-524. 3 figs., 5 tables. [5 refs.]

An electrode is described which allows the determination of the hydrogen-ion activity of a solution without alteration of the solution itself. This is achieved by enclosing the electrode, consisting of solid quinhydrone, in a collodion semi-permeable membrane, which, when immersed in the biological fluid to be examined, will measure its electrode potential without altering the bulk of the fluid by admixture with a gas or solid given off by the electrode itself. Actually, small amounts of quinone and hydroquinone diffuse through the membrane, but as they diffuse at equal rates there is no disturbing effect on the equilibria of the fluid. This quinhydrone-collodion electrode is stable in biological fluids, which are unsuitable for study by other methods. It can also be used to examine fluids, which have definite partial pressures of dissolved gases, as it can be readily adapted to use in a closed system. Readings to within one millivolt of the final value can be obtained within three to ten minutes. The electrode is easy to prepare and can be readily reproduced. For very accurate work the value of Eq should be determined by means of solutions similar or identical in composition with those to be studied and whose pH may be determined directly with the hydrogen electrode.

—W. R. WOOLDRIDGE.

SONNENSCHEIN, C. (1932). Leuchtvibrionen als Sauerstoffzehrer bei der Anaerobenzüchtung und als Sauerstoffindikator. [**Phosphorescent Vibrios as Consumers of and Indicators of the Presence of Oxygen in the Growth of Anaerobes**].—*Zlb. Bakt. I.* (*Orig.*). **123.** 378-381. [12 refs.]

Instead of using a facultative anaerobe to reduce the oxygen tension when growing strict anaerobes the author suggests using a phosphorescent vibrio. The actual method advocated is to use a petri dish divided into two halves. One half contains nutrient agar which is inoculated with a culture of the phosphorescent vibrio ; the other half contains blood or dextrose blood agar upon which the material containing the strict anaerobe is smeared. The plate is hermetically sealed and incubated. The vibrio in its growth uses up the oxygen and becomes phosphorescent, but when no oxygen remains the phosphorescence disappears. It reappears if a leak occurs. In this way the vibrio acts both as a consumer of oxygen and as an indicator of its presence.—W. R. WOOLDRIDGE.

KOVÁCS, N. (1932). Weitere Untersuchungen über den Indolnachweis in Bakterienkulturen. Die Indolbildung auf festen Nährböden. [**Further Researches regarding the Demonstration of Indol in Bacterial Cultures. Indol-formation on Solid Media**].—*Zlb. Bakt. I.* (*Orig.*). **123.** 391-397. 5 tables. [6 refs.]

In 1928 the author recommended a modification of the Ehrlich-Boehme indol reaction, using a solution of paradimethylamido-benazaldehyde in amyl alcohol and hydrochloric acid. The preparation of the test fluid is now amended as follows :—5 g. of the aldehyde are dissolved in 75 c.c. of amyl alcohol which is heated in a water bath to between 50° and 60° C. The solution is then cooled and, during cooling, 25 c.c. of concentrated pure hydrochloric acid are slowly added. When prepared in this way the reagent has a bright yellow colour and must be kept in glass or rubber-stoppered bottles protected from light.

Twenty to thirty drops are added to the medium and it is gently agitated ; it must not be shaken. The development of a cherry-red colour indicates the presence of indol. The reaction is even clearer in tryptophane media than in broth.

It was found that if the medium was heated to boiling point before the addition of the reagent, the speed of the reaction and the development of the colour were greatly accelerated.

It is well known that the presence of sugar in media tends to prevent the formation of indol and a series of experiments was carried out with cultures in broth containing various proportions of dextrose up to 2 per cent. In these it was found that, by heating the cultures as recommended, a positive indol reaction was obtained even when 0·5 per cent. of dextrose was present. It was very clear in media containing 0·25 per cent.

The presence of lactose produced less hindrance to the formation of indol as shown by the test, than the presence of grape sugar.

The next point investigated was the optimum period of incubation for the production of the maximum amount of indol and a series of tests with *Bact. coli* and the fowl cholera bacillus indicated that this ranged from four to seven days.

The reagent was found to be of very doubtful value when added to the water of condensation of slanting agar cultures or when flowed over the surface of the growth, but when the agar cultures were melted and cooled to 56° C. before the reagent was added, clearly positive results were obtained.

In the case of some cultures a greenish tinge was obtained, for which an explanation is not yet forthcoming.—A. LESLIE SHEATHER.

OFFICIAL AND OTHER REPORTS.

—. (1932). **University of California. Report of the Agricultural Experiment Station from July 1930 to June 1931.** pp. 118. Berkeley : Univ. California Printing Office. [8vo.]

This report covers all the activities of the station ; only the work related to veterinary science is dealt with here. There are 11 veterinarians on the staff of the station.

Apart from state support, much financial aid is contributed by individuals and industrial organizations, no less than $20,000 coming in from such sources during the year.

New buildings have been provided for research on animal health and disease. A very wide range of work on animal physiology and disease was performed during the period. The author of each subject reported on is not stated in every case. Under the heading Animal Husbandry the following are of interest :— a study of the oestrous cycle of the dog and the sheep ; a study on the sex hormone in the blood of pregnant mares ; mineral metabolism of cows during pregnancy and lactation and of beef cattle ; the percentage calf crop in range herds ; and the relation of nutrition and light rays to skeletal deformities in swine. Considerable work on the nutrition of farm animals was carried out.

Under the heading Veterinary Science, reports are given on many subjects. Experimental vaccination of cattle and swine with BCG was continued for the fifth year. It is concluded that BCG is innocuous to cattle when given annually in doses of 100 mg. and that, while it confers some resistance to tuberculous infection in cattle, it does not protect swine against natural infection. Important work on sensitiveness to tuberculin and on " no-lesion reactors " was done in conjunction with the U.S. Bureau of Animal Industry. Important work was also carried out on bovine contagious abortion, particularly with regard to infection of the udder, including milk agglutination tests. S and R variants of *Br. abortus*

were studied and significant results were obtained. The thermal death rate of 50 separate cultures of *Br. abortus* from animal and human sources was investigated ; it was found that none of them survived a temperature equal to that which occurs during efficient pasteurization. Bang's disease in swine received considerable attention and interesting information on the pathogenesis as compared with this disease in cattle was obtained.

Anaplasmosis of cattle was studied and as a result improvements in methods of microscopic diagnosis and treatment were made. It was found that swine fever virus could be more easily preserved by the use of eucalyptus oil as a modifying agent.

In the sphere of sheep diseases, a new organism very similar to *Erysipelothrix rhusiopathiae* was found in connection with enzootic polyarthritis of lambs. Progress was made in research on lamb diarrhoea and foot rot and a skin disease of sheep which appeared after eating sudan grass was studied.

A virus disease of horses—encephalomyelitis—which occurs in California was given much attention with successful results.

Laryngotracheitis of fowls has now received careful study and considerable information is available.

The agglutination test for *Bact. pullorum* disease was found more reliable than the pullorin test ; the stained antigen test with whole blood detected fewer infected birds than the ordinary agglutination test.

A bibliography of the publications of the staff and a list of station publications is included in the report. One bulletin—No. 503 on St. John's Wort on Californian ranges—is of veterinary interest. The results of most of the veterinary work have been published in the chief American veterinary periodicals.—J. E.

WEIDLICH, N. (1931). Tätigkeitsbericht des staatl. Veterinärlaboratoriums in Uzhorod über das Jahr 1930. [**Report of Proceedings of the State Veterinary Laboratory in Uzhorod (Eastern Czechoslovakia) for 1930**].—*Prag. Arch. Tiermed.* **11.** 160-164.

Material from 1,243 sources was investigated against 1,125 in 1929, including specimens from horses (120 cases), cattle (810 cases), sheep (13 cases) pigs (92 cases), dogs (66 cases) cats (2 cases), birds (92 cases), rabbits (16 cases) and guinea pigs (4 cases). There were also 25 bacteriological examinations of diseased meat.

The totals of officially established cases of anthrax were 613. Eighty persons were bitten by rabid or suspected rabid animals. 814 dogs were inoculated against rabies. One inoculated wolfhound showed signs of rabies nine months later, bit two children, two pigs, and a dog and died six days afterwards. A histological examination confirmed the diagnosis of rabies. Detailed accounts are given of observations made on tuberculosis in the heart of a slaughtered animal, staphylomycosis in a hare and rupture of the diaphragm in a pig.

BOOK REVIEWS.

TIPPETT, L. H. C. [M.Sc. Statistician to the British Cotton Industry Research Association]. (1931). **The Methods of Statistics.** pp. 222. 67 tables, 12 diagrams. [66 refs.] London : Williams & Norgate Ltd. [8vo.] [15s.]

A welcome addition to the shorter text-books on statistical method, since it is written mainly for workers in the biological sciences.

The aim of the author is to present a single system of acceptable statistical methods rather than to discuss classical theory of statistics or to present original procedures.

No attempt is made to provide abstruse mathematical proofs for the methods presented although, in discussing the necessary substratum of theory, proofs have been given where the mathematics involved does not transcend the binomial theorem and the rudiments of the calculus.

The subject matter is presented in such a way that biologists interested in the practical application of the methods can appreciate the arguments used and themselves acquire a statistical angle of vision. Nevertheless the book cannot be described as a primer and those not yet familiar with statistical ideas would do well to break ground with a still more elementary work [e.g. ELDERTON. (1927). " Primer of Statistics." London : A. & C. Black. 5th Edition.]

The first few chapters deal in orthodox fashion with frequency distributions and constants and with the theory of errors, but in the later chapters the underlying theme is FISHER's idea of the " analysis of variance " [FISHER, R. A. (1930). " Statistical Methods for Research Workers." London : Oliver & Boyd. 3rd Edition.] and " correlation " is introduced as a special case of this.

The popular view that statistical methods are only suitable for large samples is replaced by the contention that when the data are limited there is all the more need to use the soundest treatment in order to avoid false conclusions.

The correlation coefficient, the significance of differences between correlations, the correlation ratio as a test of association, and the principles of experimental arrangement, are all well discussed. The need for care and for sufficient technical knowledge of the subject to which the methods are applied, is duly emphasized and the pitfalls of statistical interpretations of cause and effect are well illustrated —the dangers, for example, of faulty deductions from an association constant such as the correlation coefficient being pleasantly illustrated on p. 125.

The index is adequate and the bibliography provides references to original papers not only on the more fundamental aspects of statistical theory, but also on the practical biological applications of accepted procedures. For those concerned with attempting their own computations, a short list of books containing essential tables is offered in the introductory chapter.—H. H. GREEN.

MAREK, J. [Professor of Special Pathology and Therapy at the Veterinary College, Budapest] & WELLMANN, O. [Professor of Veterinary Research at the Veterinary College, Budapest]. (1932). Die Rachitis in ihren ätiologischen, biochemischen, pathogenetischen, pathologisch-anatomischen und klinischen Beziehungen. Biochemischer Teil. **[The Aetiological, Biochemical, Pathogenic, Pathological-Anatomical and Clinical Relationships of Rickets. Biochemical Part].** pp. 476. 12 figs., 222 tables. [217 refs.] Jena : Gustav Fischer. [8vo.] [RM. 22].

This is the second part of the book ; the first volume dealing with pathology was prepared by Dr. Marek [see this *Bulletin*. **1.** 261.] and the second volume—the present work dealing with biochemistry—is by Dr. Wellmann.

In considering the personal views of the authors of this detailed experimental and comparative study of the aetiology and pathology of rickets (and *osteitis fibrosa*) in domesticated animals (chiefly the pig), the two volumes have to be read together. A critical review of so large an array of protocols is beyond the scope of this *Bulletin* and this notice therefore confines itself to indicating the scope of the second volume.

This is divided into two sections. The first deals with the metabolism of

milk and " diafarin " milk (separated milk fortified with cereal grain hydrolysed with " diafarin," a preparation of diastase) in young pigs, and with the analyses of the main tissues of the experimental animals.

The second section deals with the experiments carried out between 1912 and 1931 in artificially produced rickets, the pathology of which was discussed in Part I.

Analytical data are provided for the rations used, digestibility coefficients are calculated and the metabolism of the cases, including that of calcium magnesium and phosphorus, is discussed.

Analyses of the carcasses of the pigs were made, including the skeleton and the major organs. On pp. 307-328 the distribution over the body for dry matter, water, fat, nitrogen, energy, air, calcium, magnesium, phosphorus, potassium, sodium, chlorine and sulphur, is calculated for the various pigs concerned.

The final chapter, pp. 384-396, summarizes the findings in relation to the biochemistry and pathogenesis of rickets and to the biochemical processes in the healthy and the rachitic skeleton.

The mass of analytical data is great and should prove of comparative value even to those who do not find themselves in agreement in regard to the aetiology and to the significance of " E. A." [Erdalkali-Alkalizität, a figure expressing the relative preponderence of calcium and magnesium over phosphorus in the dry matter of rations.

In this last connection, difference of opinion is expressed in the review article " Aphosphorosis in Ruminants " [see this *Bulletin*. **2.** 391.] and attention may be called to the recent pathological paper of THEILER [see this *Bulletin*. **3.** 39.] in which bovine rickets and osteomalacia are treated from the point of view of phosphorus and calcium without reference to E.A., and also to the point of view of MCGOWAN, CUNNINGHAM and AUCHINACHIE [see this *Bulletin*. **2.** 675.] in which phosphorus deficiency is treated as the *causa causans* of rickets].—H. H. GREEN.

JAKOB, H. [Director of the Medical and Forensic Veterinary Clinic of Giessen University]. (1932). Allgemeine Therapie für Tierärzte. [**General Therapy for Veterinary Surgeons**]. pp. 223. Stuttgart: F. Enke. [RM 14.] [8vo.]

This book represents an attempt to produce a compendium embracing all therapeutical methods employed in veterinary practice. It does not give detailed accounts of individual preparations, but describes the fundamental points of the various methods including the history of their origin, their mode of action and the main indication for use. Quotations and examples anent the latter are however frequent throughout the book.

The main chapters concern the use of the following in veterinary therapy :— diet, water, massage, artificial hyperaemia, electricity, light and other rays, atmosphere, chemical preparations and biological preparations including vccines, sera, organ extracts, organ transplants and blood for transfusion.

Those who are philosophically minded will find here a dissertation on the ancient conceptions of the principles of treatment of disease by outside interference and the veterinary student will obtain a good grounding in the orthodox principles of therapeutics.

In addition to the standard drugs of national pharmacopoeia, the author also discusses critically many preparations sold under trade names, giving their compositions in a few cases or merely indicating to which therapeutic class they belong.

The book is of a handy size, has a fair index and is well printed and bound.

—J. E.